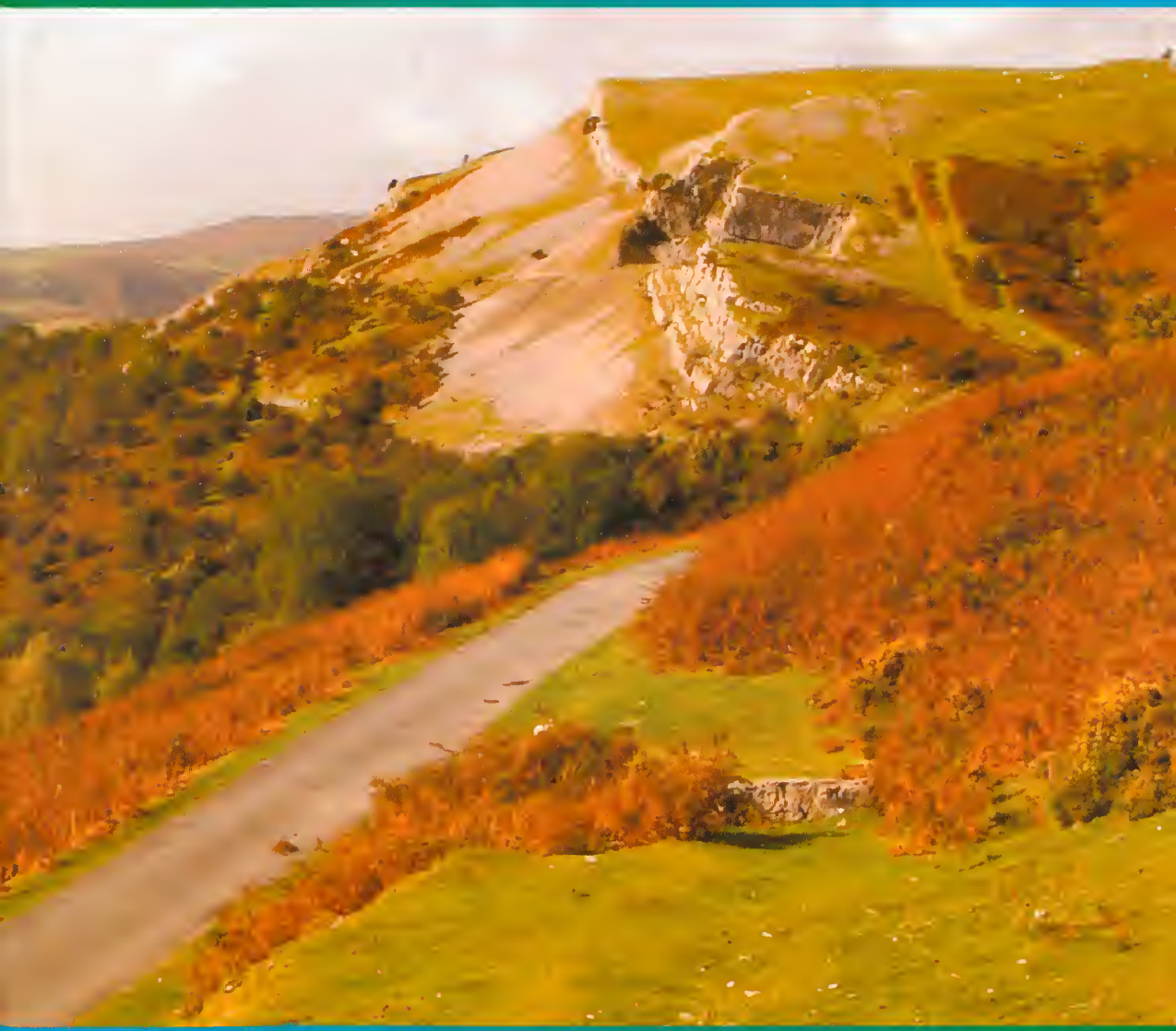
NATUR CYMRU

A Review of WILDLIFE in Wales

Rhif/Number 13 • Gaeaf/Winter 2004



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- Conserving the marsh fritillary
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- Montgomery Canal
- Dylanwad daeareg ar lystyfiant Cymru
- Down on the reserve – Tycanol
- The dangers of nitrogen pollution
- Porpoise watching from the Anglesey coast

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A Review of WILDLIFE in Wales

Golygydd/ Editor:
James Robertson
Tel: 01248 385602
jm.robertson@ccw.gov.uk

Golygydd Cynorthwyol/Assistant Editor:
Mandy Marsh
Tel: 01248 385574
m.marsh@ccw.gov.uk

Tanysgrifiadau/Subscriptions:
£12.50 y flwyddyn/per year

A fyddech gystal ag anfon sieciau yn daladwy i:
Please send cheques payable to ***Natur Cymru*** to:

Natur Cymru
Maes y Ffynnon
Penrhos Garnedd
Bangor
Gwynedd
LL57 2DW

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Natur Cymru is published four times per year, in March, June, September and December. It is supported by members of the Wales Biodiversity Partnership. They are: Countryside Council for Wales, Environment Agency Wales, Forestry Commission, Welsh Assembly Government, National Museums and Galleries of Wales, Royal Society for the Protection of Birds, Wildlife Trusts, Wales and WWF Cymru.

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Mae ***Natur Cymru*** wedi'i argraffu ar bapur di-glorin/***Natur Cymru*** is printed on chlorine-free paper
Llun y clawr/Cover image: Dinas Brân and Eglwyseg escarpment. Ffoto/Photo: Stewart Campbell

ISSN 1742-3740

Cynhyrchwyd gan/produced by: Hughes Design Limited, dewi@hughesdesign.co.uk Argraffwyd gan/Printed by: Rowlsons Limited, Colwyn Bay

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Golygyddol

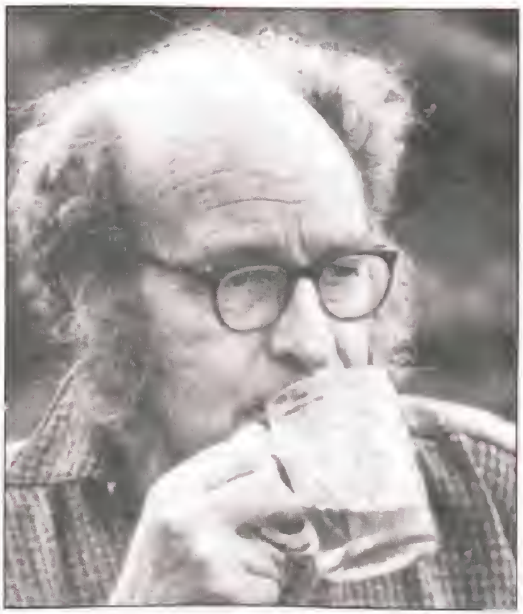
Yn ei hunangofiant *On My Own Terms*, mae John Seymour yn olrhain nôl i'w blentyndod sawl peth a fu'n agos at ei galon ar hyd ei fywyd – fel ei ymdeimlad dwfn at bobl y wlad. Mae nifer o'r llyfrau a ysgrifennodd ar ôl yr hunangofiant hwn, gan gynnwys y clasuron ynglŷn â hunan-gynhaliaeth, yn tynnu ar y cyfnod cynnar hwn mewn rhyw ffordd neu'i gilydd.

Gall atgofion cynnar fod mor fyw nes bod rhywun bron yn gallu eu blasu nhw: yn fy achos i, mae rhai o fy atgofion cliriaf yn gysylltiedig â phrofiadau a gefais o fyd natur tra'n aros mewn bwthyn ar ddarn gwych o dir comin yn Sir Benfro. Gall llyfrau hefyd danio dychymyg a bwrw goleuni a lliw i gorneli dyfnaf y meddwl: llwyddodd llyfrau John Seymour wneud hyn i mi, o'r darlleniad cyntaf o *The Fat of the Land*.

Rwyf wedi bod yn ail-ddarllen ei lyfrau yn ddiweddar, rhai ohonyn nhw yn cynnwys darluniau cain Sally Seymour. Rwyf wedi gwerthfawrogi o'r newydd y gwerthoedd a fu'n llywio'r enaid rhydd hwn, gyda'i ysbryd rhamantus a'i farn eithafol o benstiff ar brydiau, ac wedi gwerthfawrogi unwaith eto yr wybodaeth ymarferol a gasglodd drwy brofiad uniongyrchol dros y blynyddoedd. Mae'n fraint cael cyhoeddi ei feddyliau olaf, ynghyd â thysteb deimladwy i'w fywyd a'i ddylanwad.

Roedd gwarchod ac adfer camlesi yn un o'r ymgyrchoedd y bu John yn eu brwydro yn ystod ei oes. Mae'n dda gallu adrodd yma bod camlas Trefaldwyn wedi goroesi fel hafan i fywyd gwyllt ac i rai sydd am hamddena arni; nid bod y siwrne wedi bod yn un rwydd, fel yr adroddwn yma.

Am flynyddoedd lawer ac ar ddiwedd ei fywyd, Sir Benfro oedd yr hafan a borthai ei gariad at fyd natur ac at grefftwaith sy'n rhoi ffurf a defnydd ymarferol i adnoddau naturiol. Y tu ôl i'w fferm fechan mae bryn dan orchudd o goed hynafol, gyda llain o dir grugog a charegog ar ei gopa. Hwn yw'r darn o weundir a ddisgrifir yn yr erthygl sy'n son am adfer Tycanol o'r trwch o eithin a rhedyn a fu'n tagu'r tir am flynyddoedd.



John Seymour. *Efoto: Trwy caredigrwydd teulu Seymour.*

Tan yn ddiweddar, byddai bocs o fatsis wedi bod yn ateb i sawl un a ddymunai wared gordyfiant ar ddarn o weundir. Nawr rhaid i reolwyr feddwl yn ofalus cyn tanio darn o dir grugog ac anfon cymylau o fwg a charbon deuocsid i'r amgylchedd. Gochelwch rhag canfod ateb lleol sy'n achosi problem fyd eang. Mae llygredd awyr yn achosi peryglon mawr, gan gynnwys cawodydd o nitrogen. Wrth i chi ddarllen y geiriau hyn nawr, mae fel petai rhyw chwyrliwr gwrtaith anferth yn yr awyr yn chwalu nitrogen drostom. Does dim ei angen arnom ac mae'n peryglu ein cynefinoedd bywyd gwyllt gorau.

Y tu ôl i fygythiadau difrifol fel hyn cawn straeon yn aml am ymroddiad a mwynhad pur. Cyfuniad o'r ddau sydd wedi llwyddo dangos i ni bod yna lamidyddion yn bwydo ac yn teithio o gwmpas glannau Sir Fôn ac mae'n dda gwybod bod y genhedlaeth nesaf yn cael eu cynhyrfu gan y mamaliaid môr hyn ac yn helpu sicrhau dyfodol ar eu cyfer.

James Robertson

Editorial

In his autobiography *On My Own Terms*, John Seymour traces many of his lifelong obsessions, such as his deep affinity with country people, to early childhood. His many subsequent books, including the classics of self-sufficiency, trawl this youthful territory in one way or another.

Early memories can be so vivid, it is as if you can taste them; in my case, some of the sharpest ones involve close encounters with nature when staying in a cottage on a glorious common in Pembrokeshire. Books can similarly light up that part of the brain we call the imagination; and this John Seymour's books, starting with *The Fat of the Land*, managed to do for me.

I have been re-reading his books, some with Sally Seymour's exquisite illustrations, and appreciating anew the values underlying John's, at times, fearsomely opinionated and incurably romantic free spirit, as well as all that hard-won practical knowledge. It is a privilege to be able to publish his last thoughts, along with a moving account of his life and legacy.

One of John's many campaigns was for the preservation and restoration of canals. Happily the Montgomery Canal has survived as a haven for wildlife and for leisure; not that it has all been plain sailing, as we report here.

For many years, and at the end of his life, Pembrokeshire provided the crucible for his love of nature and of the crafts by which natural resources take shape in human life. Behind his small farm was a hill cloaked with ancient wood, and topped with open, boulder-strewn heathland. This heath features in an account of how Tycanol is recovering from a gorse and bracken embrace.

Not long ago, a box of matches might have provided a suitable remedy for overgrown heathland. Now a manager has to think twice before setting a heath ablaze, sending acrid smoke and carbon dioxide into the atmosphere. Beware a local solution which adds to a global problem. Air pollution poses great dangers, not least nitrogen fallout. As we report, it is as if some giant fertilizer spinner in the sky is showering us with unwanted nitrogen, impoverishing our best wildlife habitats in the process.

Behind serious threats like this are often stories of dedication and delight. It has taken both to reveal the numbers of porpoises feeding and travelling around the coast of Anglesey; and it is good to know that the next generation is thrilling to these sea mammals, and helping their cause.

James Robertson

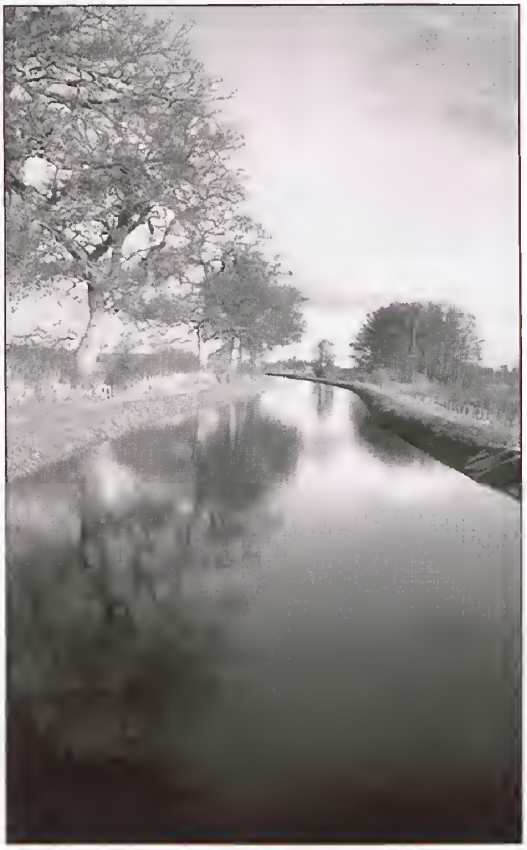


Photo: Jonathan Briggs.

Montgomery Canal.

Is John gone? The legacy of John Seymour

John and his daughter Anne.

Photo: Kett Seymour.

John Seymour, most closely associated with the self-sufficiency movement, was no fan of modern living. Yet the cause which drove him was a positive one, which affirmed the joys of living a connected existence, close to nature, and the validity of living simply, whether hunter-gathering, fishing, or small-scale farming. His was a truly ecological vision, with humans an integral part. Here ***Vicky Moller*** *gives a personal insight into a remarkable life and legacy.*

John Seymour died in September, aged 90. Known as the father of self-sufficiency, he wrote over 40 books, and was also a thinker, soldier, sailor, farmer, drinker, musician and above all, radical activist. He had a huge effect on many people, as he discovered in his journalistic ramblings round Wales. Overnighting with strangers, he opened their copies of his books to find soil on the gardening pages, butter on the dairy pages and blood on the slaughtering pages.

He was brought up in an Essex manor, but spent his time with farmers and craftsmen, and developed his commitment to nature and traditional rural ways early. He loved the countryside: "I knew every inch of it, and was familiar with every bird, flower, tree, and hill. I had spent those years in a kind of mystical, magic dream. I had loved the depths of the great beech woods...the flash of a kingfisher across the surface of the Stour."

His family then moved to London, where he hated the petty snobberies. "I call them the boring twenties, not the roaring twenties". As soon as he could he left for Africa, where began a life of freedom and adventure. From stockman to fisherman to miner and explosives expert, hunter to vet – he rode, walked and worked through south and north-west Africa.

At the start of the war he joined the King's African Rifles and led his platoon – "white officers with black privates" – to help drive the Italians from Ethiopia and the Japanese from Burma. He accepted promotion to Captain

only on condition that he remained actively fighting alongside his platoon. John lived with the villagers, hunted with bushmen, learned Swahili and fed his men with his rifle. He respected the courage of the Japanese, and was devastated when he heard about Hiroshima. John cried then as he cried in his last years at the memory. "That was despicable," he told me, "killing all those women and little children. I cannot forgive the Allies, we didn't need to do a filthy thing like that."

Getting back to basics. Photo: Kett Seymour.

After a spell at the WarAg, organising farm work for prisoners-of-war and looking after the women's land army – settling disputes with the employers, having sing-songs and working with them on the harvest – he took to radio journalism and book writing. In 1954 he married Sally, and they started out living on a barge with their babies. He wrote and she illustrated *Journey through England*, a book that helped re-open abandoned canals. Then they found a five-acre holding to rent in Suffolk. It was so remote that when they needed milk for the children they decided to buy a cow, and so began the Self-Sufficiency Movement. He had most of the ideas and she made sure they came to fruition. They produced *The Fat of the Land*, the book that started it all, now reprinted and available from John's daughter.

In 1964 the family bought a farm in Pembrokeshire. He said: "I was back in a peasant society where people still brewed beer and killed pigs, and we were no longer freaks". He and his farming neighbours were constantly brewing and singing. Children who were young then look back on those as golden days. He became involved in wider movements, made friends with Gwynfor Evans and, with Plaid Cymru friends, removed sign-posts to help the Welsh language movement. Among his friends were Fritz Schumacher, of *Small is Beautiful* fame, Satish Kumar, who ran *Resurgence* magazine, Christopher Day, founder of ecological architecture, and Lady Eve Balfour's family – she was founder of the Soil Association and organic movement.

Here John wrote the *Big Book of Self-Sufficiency*, which sold in its millions in many languages. His fame grew, and a community gathered around him. Sally left to run her own small-holding, and I joined John with my three children after his second marriage had ended. People thought him brave to take us on – he was!

Times changed: as the destruction of the planet and the domination by corporations became public knowledge the counter currents of organic eating, ethical and local purchasing and clean energy grew. John was increasingly called on to write, talk and produce TV series like *Far From Paradise*.

John and Sally. Photo courtesy the Seymour family.

View of Mount Carningli from John's green burial site. Photo: Kett Seymour.

The area where he lived is now rich in traditional skills and a thriving neighbourhood of people influenced by and, in our imperfect way, living out his dream. Within a mile of his grave, tucked in the hills and woods, are a blacksmith, mechanic, joiner, small-holders, tree nursery, seamstress, candle-maker, herb farm, baker and an eco-community. That this little economy is environment-friendly is proven by our ancient sessile oak woods carpeted in lichens, and visited by lichenologists from Europe. And the influence has spread outwards.

The village of Newport three miles away has a thriving complement of traditional shops and an Eco-centre. People travel from cities to Christmas shop in our village! Unfortunately its house prices rival London's as a consequence of its popularity. The wholefood shop has a stunning range of organic breads and vegetables produced within eight miles. The garage sells organic milk for conventional prices from a nearby three-farms co-operative. All the butcher's meat is local. Pembrokeshire surpasses any Welsh county for organic businesses, from small to 2,000 acres run by six farmers co-operatively, many now pioneering renewable energy. And the activist tradition is unbeaten: when GM crops were planned organic farmers and writers led the county to action and within two months the GM farmer had to abandon the idea.

John died as he had lived. After his week-long 90th birthday, he said: "I've travelled three continents, I've written 40 books, I've done enough on this planet, I want to die". He had cancer, but he went ahead of his illness, knowing what he was doing. He refused food and lay staring ahead very calmly. Asked if he wanted anything at all he answered simply, "Death".

His daughter and her family filled the room with welcome and beauty. People called and sat talking round the candle while John made his final journey. The doctor who happened to be there when he died was moved and said she felt extremely privileged to experience such a death. There was humour too; the natural coffin didn't arrive in time, so the funeral guests built a bier to carry John, wrapped in home-made blankets made from his own sheepswool. He is buried in a little field on his farm looking out at Mount Carningli. His sons and friends dug the grave and found the headstone lying in it, and they built a stone seat next to the grave for contemplators. No professional undertaker, no expenses, a self-sufficient ending!

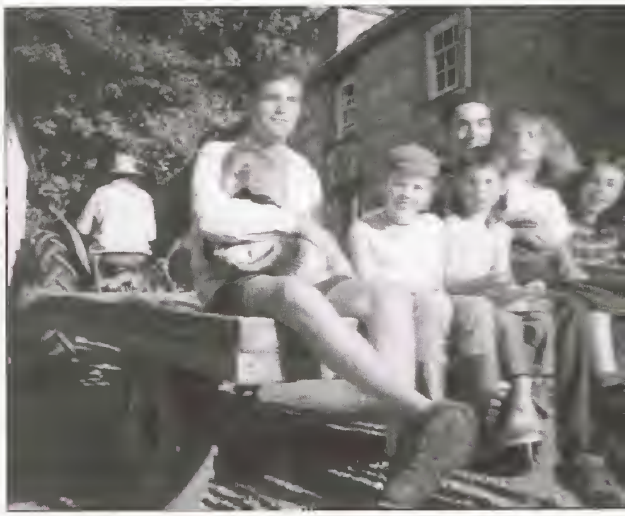
John campaigned to the bitter end. When he lived in Ireland he led a meeting of a hundred people to uproot GM crops. There was a famous trial of the 'Arthurstown seven', who had destroyed so many GM fields that the corporate giant Monsanto had given up in disgust. In court John, aged 86, said: "If a government does not take action to protect its citizens from serious danger, is it reasonable that the citizens should take action to protect themselves?" and "If I did nothing I would go to hell and I would rather go to gaol than hell". The judge invoked a little used probation act to ensure that while he could not let them off, he didn't have to punish them either!

It is easy to be dispirited under the shadow of current events, and John in his old age felt an anguish that brought tears to his eyes because he could do no more. Yet he was one of a small band of people who did change the tide of history. His inspiration came from an entire life working and living with nature and from his passionate respect for country people. In turn innumerable people, inspired by his books, changed the course of their lives. Governments now acknowledge that Sustainable Development is the only option, but can't seem to change gear, yet people all over Wales have already done so, learning from each other, from the past and from John's books. The mass is getting critical in our patch: only last month our local papers started regular Ecopages supported by green businesses.

John is survived by ex-wives Sally, Frances and Vicky and his six children, Anne, Kate, Jane and Dai, Helen and Kett. We are all friends and cherish our part in John's life.

Vicky Moller is chair of Plaid Cymru Green Group, was married to John and has written this memoir. John's first self-sufficiency book *The Fat of the Land* is available from Anne Seymour, Fachongle Isaf, Newport, Pembs. SA42 0QR

John and Vicky. Photo: Kett Seymour.



Harvest time. Photo courtesy Seymour family.

John Seymour

Roedd John Seymour, a fu farw ym mis Medi yn 90 oed, yn gymeriad hynod a lliwgar. Llwyddodd i fyw sawl bywyd yn ystod un oes ond mae'n fwyaf enwog efallai am ei gysylltiad â hunan-gynhaliaeth. Bu ganddo ymrwymiad erioed at fyd natur ac at ffyrdd gwledig a thraddodiadol o fyw. Ond roedd ysbryd antur a menter ynddo hefyd. Aeth i'r Affrig am gyfnod pan yn ifanc; yn ddiweddarach, ar ôl dychwelyd, dechreuodd y Symudiad Hunan Gynhaliaeth – a hynny o ganlyniad i angen gwirioneddol, wedi iddo yntau a'i deulu symud i dyddyn ym mherfeddion Suffolk!

Trwy gydol cyfnodau eraill yn ei fywyd, yng ngogledd Penfro ac yn Iwerddon, daliodd ati i hyrwyddo ffordd o fyw a oedd yn syml ac yn agos at natur. Ond nid ffordd enciliol o fyw oedd hon chwaith; gweledigaeth eangfrydig oedd ganddo ac ymhelodd â nifer o achosion eraill. Ysgrifennodd 40 llyfr – y mwyaf dylanwadol ohonynt oedd *The Big Book of Self Sufficiency*. Ymgyrchodd yn daer hyd y diwedd, gan arwain protest yn erbyn cnydau GM yn Iwerddon ac ymddangos yn y llys yn 86 oed i amddiffyn ei weithred.

The Age of Healing is ready to be born.

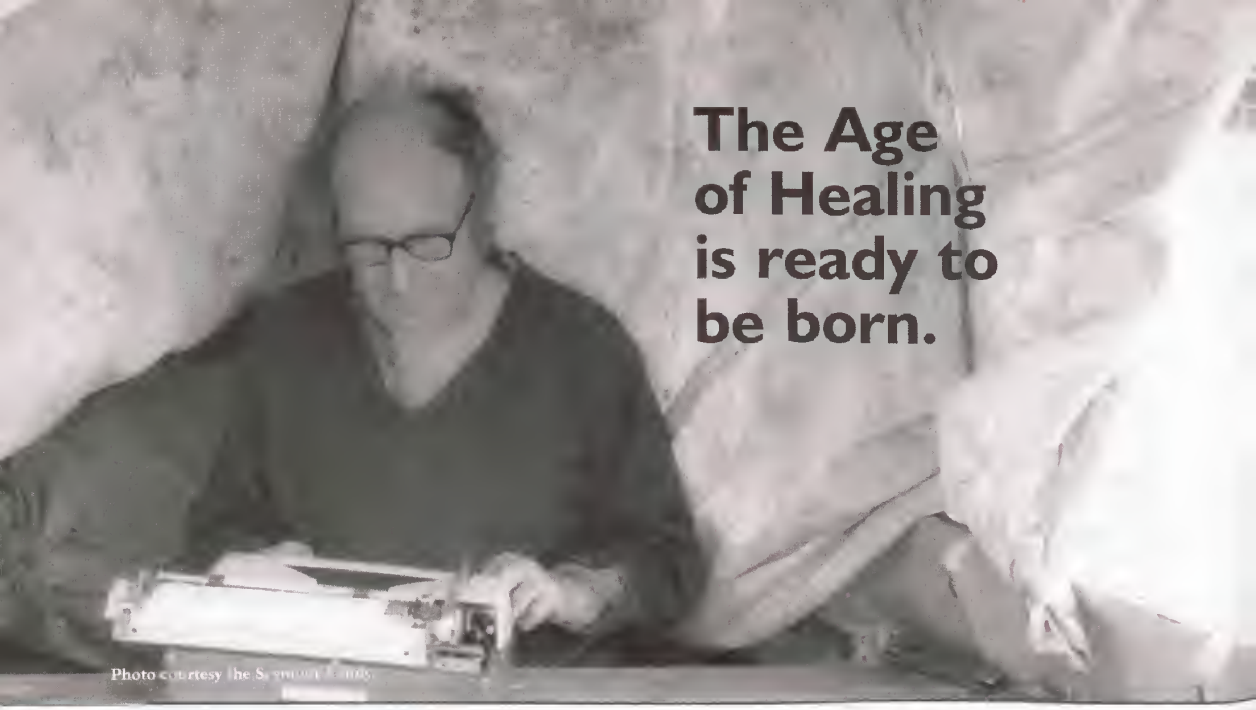


Photo courtesy the Seymour family.

After a ninety-year love affair with the green planet Earth and its small farmers and skilled country folk, ***John Seymour*** *was convinced that people must change, and learn to nurture the Earth, so that we can be nurtured in return. He wrote the following call to arms shortly before his death.*

Photo courtesy the Seymour family.

"The Age of Plunder, which was the natural successor to the so-called Age of Reason, is nearly at an end. For 200 years now the greedy and ruthless have been plundering the planet, but their time will soon be up. The Age of Healing is ready to be born.

It could not have gone on much longer anyway – because soon there will be nothing left to plunder. The forests have almost gone from the Earth, the fish of the sea are all but exhausted, the air surrounding us and the waters of the Earth will soon be able to take no more poisonous wastes. When the oil reserves run out, agribusiness will no longer be able to produce chemical-grown food, and the final account, long deferred, will come up for payment.

One of the most dramatic effects of the age has been to drive most of the world's population into vast conurbations, dependent on an enormous system of transport which brings water, food, power, fuel and all the necessities of life, often great distances. Any breakdown in the supply of all this would be disastrous.

If we open our eyes, we will realize that all this is bound to come crashing down in the end. We will begin, just you and me, to heal the ravaged Earth. On our infirm shoulders we must take up this heavy burden now – the task of restoring the health, the wholeness, the beauty and the integrity of our planet. We must start the Age of Healing now! Tomorrow will be too late."

John Seymour

Joining up the dots – conserving the marsh fritillary

Adult marsh fritllary butterfly. Photo © Richard Smith.

All the fritillary butterflies have an appeal beyond mere beauty. They belong to a time of extensive natural landscapes, before nature became confined to small pockets of habitat. This is particularly true of the marsh fritillary – it needs to be conserved at a landscape scale. Here ***Deborah Sazer*** *describes a project designed to do just this.*

Photo: Caroline Bonnan/Butterfly Conservation

Wales is home to some of the strongest UK populations of the charismatic marsh fritillary butterfly. But many Welsh colonies are in serious danger. That's why a new partnership has been established in Carmarthenshire, working with landowners to protect and enhance some of Wales' best damp grassland sites for the marsh fritillary. We hope to reverse the effects of years of habitat decline in this key area, part of which is a candidate Special Area of Conservation (a wildlife site of European importance) because of the marsh fritillary.

The status of the marsh fritillary

The marsh fritillary *Euphydryas aurinia* has suffered an astonishing decline in Britain, disappearing from 60% of 10km squares between 1970 and 1999. It is now restricted to western Britain, with strongholds on damp grasslands in south and west Wales, southwest England and southwest Scotland. There are also significant populations on chalk grasslands in southern England.

The combined effects of agricultural intensification and urbanisation have destroyed and degraded the habitat, and much of what's left is in small, isolated fragments. However, the marsh fritillary needs very large, continuous or closely connected patches of habitat to persist in the long term. Therefore, without the active involvement of landowners and managers across the countryside, the marsh fritillary will struggle.

Rhos pasture

Purple moor-grass and rush pasture, known as rhos pasture in Wales, occurs only along Europe's Atlantic edge. These damp grasslands form in areas of high rainfall on poorly drained clay and peat soils. Roughly 35,000ha of rhos pasture remain in Wales, a considerable share of the UK total.

In addition to devil's-bit scabious, which is the foodplant of marsh fritillary caterpillars, rhos pasture can be rich in plants such as sedges, ragged robin, greater bird's-foot trefoil and, on less acid soils, meadow thistle. The fine leaves and mid-summer white blossom of the whorled caraway are so characteristic of rhos pasture that it has been chosen as Carmarthenshire's county plant.

Rhos pastures are home to many other important and declining species, such as snipe, reed bunting and brown hare; dormice live in the intervening hedgerows. The grasslands are also rich in spiders, beetles and many other invertebrates.

Freshly laid egg batch on Devil's-bit scabious

Life cycle

Marsh fritillaries fly in late May and June, when females lay batches of up to 350 eggs on the underside of large devil's-bit scabious leaves; large plants provide greater food resources for the communal caterpillars. The brown-black, spiny caterpillars feed from August until late September on the leaves inside a silken 'larval web'. When they finish eating one leaf, they move off as a group onto a new leaf and spin another web. The caterpillars hibernate together over winter, in a small, tight web deep inside grass tussocks. They become active again in February/early March, and, on sunny days, are seen basking on stems and leaf litter. The group soon splits up, when individuals may wander several metres to find fresh scabious leaves. They pupate on the ground from late April/early May, and the adults emerge two to three weeks later.

Habitat specialist

Marsh fritillary caterpillars feed almost exclusively on devil's-bit scabious (although they occasionally eat honeysuckle in Wales). The globe-shaped scabious flowers can turn late summer rhos pastures lavender-blue. The leaves support many other invertebrate larvae, including the uncommon narrow-bordered bee hawkmoth, and the flowers are a critical nectar source for late summer insects, when most other flowers have gone to seed.

However, abundant devil's-bit scabious alone is not sufficient – the sward structure is equally critical. The marsh fritillary requires a mosaic of tall (12-25cm) tussocky grasses, such as purple-moor grass, interspersed with shorter vegetation. Larval webs are often found on the boundary between the two, where the tussocks provide a warm 'micro-climate' in which the caterpillars can develop quickly.

Management

This mosaic of sward heights can only be maintained over time by light grazing. A recent study of extinct English marsh fritillary sites showed overgrazing as the most common cause of loss, with under-grazing/no grazing running a close second.

Cattle are ideal at creating this mosaic, at low enough numbers to prevent over-grazing (roughly one cow per hectare for three months of the year). Their hooves also create bare areas in which devil's-bit scabious and other herbs can germinate.

Fortunately, there are few sheep at Mynydd Mawr, which helps make it suitable for the butterfly. Sheep produce a short, tight sward and, unlike cattle, they eat devil's-bit scabious leaves and flowers. Only small plants remain, and little regeneration occurs.

Horses and ponies come somewhere between these two. Hardy native ponies, such as Welsh cobs, will tackle rough grasses. At low numbers they have a beneficial impact, especially on sites that also feature cattle, such as Rhos Llawr Cwrt National Nature Reserve in Ceredigion. Many Mynydd Mawr fields are grazed by non-traditional breeds of horses, which can severely over-graze large patches and ignore others altogether.

Mating pair of marsh fritillaries. Photo © Richard Smith.

Many un-grazed or under-grazed sites need one-off or rotational scrub cutting, to halt scrub invasion of the grassland. Dense leaf litter may also require removal. Controlled, fast burning of small patches in late winter is the traditional management in some regions, where it opens up the habitat without killing hibernating caterpillars. However, this method should be considered very carefully, and only undertaken where traditional.

Alternatively, where the ground is not too wet or uneven, mowing may successfully remove dense litter, rushes and young scrub from neglected grassland. But this creates a very even sward, which is unsuitable for the butterfly. Only small areas should be mown at any one time, and grazing should follow, to restore the tussocky structure.

Mynydd Mawr Marsh Fritillary Project

We now understand the marsh fritillary's requirement for large patches of rhos pasture, and we have become increasingly aware of the necessity to look after wildlife throughout the wider countryside. Hence, the Mynydd Mawr Marsh Fritillary Project began in April 2004 to conserve this butterfly across the landscape. It is a five-year partnership between Butterfly Conservation (the Lead Partner for this UK BAP Priority species) and the Countryside Council for Wales (CCW), and is the first Welsh landscape-scale project for an invertebrate.

The Project is centred at Cross Hands in southeastern Carmarthenshire, on the former Mynydd Mawr (Great Mountain) Common. The common was enclosed in the early 19th century, creating the present landscape of small enclosures partitioned by hedgerows and ditches. Until recently, mining was the main source of income, leaving most owners free from the pressure to intensify their farming systems. Thus, Mynydd Mawr features one of the largest populations of marsh fritillary and rhos pasture in Wales, including Butterfly Conservation's reserve at Caeau Ffos Fach.

However, widespread threats to the butterfly and its habitat are:

- lack of suitable grazing, causing a dense cover of purple moor-grass and/or scrub to develop.
- overgrazing, particularly by horses, which has altered the vegetation structure required by the marsh fritillary.
- haycutting and topping, which damage the sward structure and the caterpillars.
- development (housing, business parks and roads).

Caterpillars in the larval web. Photo © Richard Smith.

Following the decline of mining, Cross Hands was understandably targeted for regeneration, as seen at Cross Hands Business Park. The continual 'ribbon development' housing along the roads has caused the villages to merge into one. Much of this development has been at the expense of rhos pasture, which has been perceived as unproductive wasteland.

Pupa. Photo © Richard Smith.

The key to the project will be management agreements. CCW will fund any owners willing to manage their rhos pasture with suitable grazing, along with payments for cutting scrub, installing livestock-proof fencing, etc. Most landowners are not in the farming 'loop', and have never received or considered applying for agri-environment scheme payments or subsidies. We will help them apply for the grants, simplifying the process as much as possible. Equally important, we will offer management advice and links with contractors, conservation volunteers, graziers and machinery rings. The project cannot succeed without the involvement of the local community. We will publish newsletters and hold open days, talks and walks to alert people to the unique importance of Mynydd Mawr. We are actively encouraging local people to become involved, for example by helping survey for the marsh fritillary and other key species (including bumblebees and farmland birds). We hope to involve everyone from the larger landowners, local councillors and community groups, to the people who walk their dogs on these sites, attend the local schools and work in local businesses. In return, the project should boost the local economy by providing work for machine hire companies, contractors and others.

We are also working closely with Carmarthenshire County Council, the South and West Wales Wildlife Trust, the RSPB and the many other groups working to enhance wildlife in the area. We have alerted the local planners to the importance of the butterfly and its habitat, and are working to minimise further losses. We hope that the Mynydd Mawr Project will become a model for similar ambitious schemes throughout Wales and beyond, as much by learning about the processes involved as by its on-the-ground success.

Deborah Sazer is the Mynydd Mawr Marsh Fritillary Project Officer for Butterfly Conservation Wales.

Acknowledgements
Many thanks to colleagues at Butterfly Conservation, Adrian Fowles and Nigel Stringer at CCW, Richard Pryce and John Anderton.

If you would like more information about the project, or about Butterfly Conservation and its reserve at Caeau Ffos Fach, please contact: Butterfly Conservation Wales, 10 Calvert Terrace, Swansea SA1 6AR. Email: wales@butterfly-conservation.org, Web: www.butterfly-conservation.org

Cynnal brethyn tirlun ar gyfer y brith prin

Mae brith y gors wedi prinhau yn frawychus ym Mhrydain ers y 1970au a chan ei fod yn dibynnu ar fodolaeth ardaloedd mawr o dir rhos, neu ar rwydwaith o safleoedd addas, rhaid gweithredu ar draws tirluniau cyfan i sicrhau ei ddyfodol. Dyma'r bwriad wrth sefydlu prosiect Mynydd Mawr, ar y cyd rhwng Gwarchod Glöynnod Byw a Chyngor Cefn Gwlad Cymru.

Mae'r ardal hon, ger Cross Hands, yn cynnal un o'r poblogaethau mwyaf o frith y gors yng Nghymru. Ond mae'r cynefin rhos wedi dioddef yn sgîl y datblygiadau a'r newidiadau i reolaeth y tir ers cau y pyllau glo. Mae'r erthygl yn disgrifio rhai o brif anghenion y glöyn byw hwn – yn cynnwys planhigion tamaid y cythraul, prif fwyd y creadur, ynghyd â thywarchen dwmpathog sy'n cynnig hinsawdd addas ar gyfer gweoedd y lindys. Mae'r prosiect yn cynnig taliadau i rai sydd â thir rhos i'w reoli er mwyn creu y cyflyrau cywir, ac yn annog pobl leol i gymryd rhan ac i ddysgu mwy am fywyd gwyllt yr ardal.

Llên y llysiau:

dyddiadur Robert Bulkeley, Dronwy, 1631-35

A hoffech wybod mwy am brosiect Llên y Llysiau? Cysylltwch felly â safle we'r Gymdeithas www.cymdeithasedwardllwyd.org cliciwch ar y botwm *Llên y Llysiau* ... ac fe welwch safle newydd arbrofol y prosiect gyda chyfle i ychwanegu eich sylwadau ac i gyrchu'r wybodaeth a gasglwyd hyd yma. Rhowch gynnig arni, mae'n hawdd! Neu, os yw'n well gennych, rhowch nodyn ar bapur a'i anfon at **Haf Meredydd, 14 Stryd Wesla, Porthmadog, Gwynedd**.

Llên y Llysiau (the Lore of Plants) is a project initiated by *Cymdeithas Edward Llwyd* to collect information on the cultural connections of plants in Wales. Data is available on the *Cymdeithas Edward Llwyd* interactive website. We welcome any contributions regarding the cultural connections of plants, either directly to the website or by mail to **Haf Meredydd** (see above).

Rhan 2: Byw a Bod

gan **Duncan Brown**

Yn y rhifyn diwethaf o *Natur Cymru*, cyflwynais grynodeb o rai cofnodion amaethyddol Robert Bulkeley. Y cofnodion am y tywydd ac am gnydau grawn a gwair oedd prif destun y rhan honno. Yn y rhan yma fy mwriad yw ymdrin â'i gofnodion "llysieuol" eraill, gan gynnwys bwyd a diod, offer, tanwydd, adeiladu, dillad ac enwau lleoedd.

Bwydydd

Cyfeiriodd Robert Bulkeley at **afalau**, **gellyg**, **eirin**, **nionod**, **pannas**, **perlysiau** ac **olew llin**. Prynai werth ychydig geiniogau ar y tro o'r rhain yn y siop ym mhentref cyfagos Llanrhuddlad, rhwng misoedd Awst a Rhagfyr. Byddai'n rhoi y ffrwythau weithiau fel lluniaeth i'w fedelwyr tra roeddent wrth y cynhaeaf. Mae'r cofnodion am y rhain wedi eu gwasgaru trwy'r dyddiadur, ond dyma enghraifft.

9 12 35 my man owen bought me yesterday at Bewmares faire a q[uarter] beefe 5s 3d, two sheepe skins 12d, beesoms 2d, oinions 2d, apples, 2d, arnodd 2s 2d, 6 doleu 15d, 4 gwadan arad 14d, iau 4d, dau gorn ijd...

Prynodd **eirin sych** ("resins") a **phrŵns** (eirin lled sych?) yn ystod y gaeaf hefyd. A bwrw nad oedd yn bosibl cadw ffrwythau am gyfnod hir iawn, beth oedd ffynonellau'r fitaminau hynny sydd i'w cael mewn ffrwythau yn ystod gweddill y flwyddyn i Robert a'i gyfoeswyr? Prynodd hadau pannas ym mis Mawrth, yn ffair Llanerchymedd *(I paid for parsneps seed xijd)*. Ai ar gyfer yr ardd lysiau oedd y rhain?

Prynodd sbeisys ddwy flynedd yn olynol yng nghanol mis Rhagfyr, at ryw ddathliad mwy egsotig na'r arfer o gwmpas y Nadolig efallai? Er na wyddom at ba sbeisys y cyfeiriodd, gwyddom o'r gorau nad oedd y fath bethau yn ddieithr i Gymry mwy goludog y Canol Oesoedd. Yn ei gerdd o foliant i Sieffrai Cyffin a'i groeso boneddigaidd, canodd Guto'r Glyn ddwy ganrif ynghynt am sinsir, clôfs, ciwmin, siwgwr â mês (ac felly nytmeg):

Sinsir a welir ar fwyd
A graens da at yr annwyd.
Sinamwn, clows a chiwmin,
Siwgr, mas i wresogi'r min.

Cyfeiriodd yn aml at *wassails*, sef diod llawn sbeis a gymerwyd i ddathlu Calan Gaeaf a Nos Ystwyll. Cynhaliwyd y waseiliau hyn, yn ôl y dyddiadur, ddechrau mis Chwefror yn ddieithriad (yn y mis hwn yn unig y cynhaliwyd sesiynau ymladd ceiliogod hefyd). Cyfeiriodd ym misoedd Mai a Mehefin at brynu *lactuals (I paid 19d ob lactuals)*, llaeth mae'n debyg, neu gynnyrch ohono, megis caws a 'menyn. (Nid yw'r gair hwn yn ymddangos yn y *Shorter Oxford English Dictionary* ond tybiaf ei fod yn cyfateb i *victuals*, sef bwyd). Cafodd ffircyn (llond casgen bren fechan, neu fesur o 9 galwyn?) o ymenyn ddwywaith ym mis Rhagfyr. Prynodd **fara** a thalodd geiniog am dorth wen, bara amheuthun y bonedd ar y pryd. Ym mis Mehefin prynodd **olew llin** *(I paid…3d for lincet oyle)* a finag.

Diodydd

Fel yr awgrymwyd yn y rhan gyntaf, y nodwedd sy'n taro darllenydd y dyddiadur hwn yn fwy na dim arall yw hoffter y dyddiadurwr, a'i gydnabod, o lymeitian. Cyfeiriodd dro ar ôl tro at yfed, meddwi, *wassails*, *tipls*, ac at rialtwch o bob math, hyd yn oed mewn angladdau. Rhwng 1633 a 1655 cofnododd iddo fynychu angladdau 30 o weithiau (cyfartaledd o un y mis), mwy na hanner ohonynt yn ystod y gaeaf a'r gwanwyn.

23 7 35 *this night I was drunke & lost my hat, god forgive me*
20 4 33 *…lighted at dro[nwy]: being somewhat far gon in drinke, they dranke a long while, after a while I rid behind mr owen to HP's house*

Cyfeiriodd at frag *(I received of hugh powell 11s 6d for malt)* ac at *bragot*, math o ddiod brag a gynhyrchwyd yn y gorffennol drwy eplesu cwrw a mêl. Cyfeiriodd at amryfal ddiodydd eraill, megis **aqua vitae** (math o frandi, neu wirod o **rawnwin** oedd aqua vitae; fe'i cafodd mewn siop am ddwy geiniog). Yfodd fedd yn nghartref cyfaill *(at [Rees'] howse j dranke **medd** there)* a thalodd chwe cheiniog i Besse ei wraig am fêl ddiwedd mis Awst, efallai i fragu medd? Cyfeiriodd at *ale* (cwrw di-hopys?) a beere (cwrw â blas hopys?), ac at ffeirio hopys ym mis Mai *(he bestowed ye li hops I had of him a while ago)*.

Pethau, defnyddiau a gweithgareddau

Adeiladu: Soniodd am orchwylion adeiladu yn aml, ond ychydig iawn am y math o adeiladau. Roedd llechi a thoeau **moresg** (diwydiant lleol wedi ei ganoli ar dwyni Aberffraw a Niwbwrch), fel ei gilydd, yn ddeunydd to. Dywed mai llechi o Henborth, (ger Cemaes) a ddefnyddiodd ar gyfer ei dŷ *(ye slater digs up slates at henborth)*. Beth yw natur y graig yn Henborth heddiw, a pha ansawdd o lechi a gafwyd o'r lle hwn? Cyfeiriodd yn aml at borthladd Cemaes.

Ychydig o goed praff oedd yn bodoli ym Môn yn y cyfnod, os oedd arferion Robert yn unrhyw arwydd. Aeth i Glaslyn (porthladd anhysbys i mi) i nôl coed adeiladu *(draught tymber)* ar sawl achlysur yn haf 1631: *vespi* [gyda'r nos] *I was at glaslyn there was **tymber** newly come from Ireland.* Gweithiodd y töwr am naw diwrnod ddiwedd mis Tachwedd 1631 yn gosod to llechi ac fe dderbyniodd ddau swllt a grôt am ei drafferth. Pwy oedd y crefftwyr a fu'n gweithio i Robert felly wrth godi adeilad neu roi to ar ei dŷ? Hugh Probert oedd y saer a gododd y trawstiau: *Hugh probt set vp ye **Beames***

Henry Pryce a gyflenwodd y tanau moresg: *h pryce ap h gaue me a 100 taneu moresg* neu fe'u prynwyd o ffair Aberffraw, un o ganolfannau'r diwydiant moresg *(I set to Aberfro fayre, I bought there 3 yokes 18d 200 **taneu** 6d)*. Cafodd bolion oddi wrth H. Ednyfed, Trefadog: *I rid to trevadog to Bargaine for few **poles** of H Ednyved.* Cafodd distiau *[sparras]* oddi wrth Rees Lloyd. William Pritchard a John Parry oedd y towyr moresg.

Yn ystod haf 1631 bu'n atgyweirio neu'n codi beudy: *w prich: yn kledry ty'r ychain & begins to **thatch***. "Cledru" oedd gosod coed cryf i gynnal coed eraill. Aeth i lan y môr i hel cerrig mân yn y cyfnod hwn, i'r un perwyl mae'n debyg *(I was at seaside for gro)*. Ym mis Medi 1631 talodd sawl ymweliad â llongddrylliad ym Mhenrhyn a

ddilynodd *a most horrible storme of wind & rayne all night*. Ni ddywedodd paham yr aeth yno ond mae'n siŵr iddo loffa pob math o nwyddau a sbarion coed at ddefnydd ei waith adeiladu. Ym mis Tachwedd yr un flwyddyn cyflogodd döwr llechi i atgyweirio to ei dŷ *(ye slater is slating my howse)*. Gan iddo orfod codi llechi o'r ddaear ar gyfer yr adeilad hwn, gallwn gymryd efallai mai to gwellt oedd arno gynt. Ai dyma arwydd o symudiad i ddefnyddio llechi ar dai Môn yn hytrach na gwellt?

Trin y Tir: Soniodd lawer am **eithin**; am osod *y dryll eithin* i Owen Lewis, am godi eithin o'r ddaear a'i gario ymaith *(he is to dig vp ye gorses & to carry them)*, am eithino (sef berdio neu blethu eithin fel ffens i reoli stoc[1] *(I am to pay [ ] 4s for dig: & eithino Buarth yn y kae glas)*, neu am dorri eithin neu ddrain. Nid oes awgrym ei fod yn defnyddio eithin ar gyfer porthiant i dda, ond mae'n ddigon posib bod hynny wedi digwydd.

Difyr fyddai gwybod ai'r eithin Ffrengig estron *Ulex europeaus* a ddefnyddiai, neu'r eithin mân *Ulex gallii*. Ni wyddys i sicrwydd pryd y cyrhaeddodd y cyntaf i Gymru ond fe'i defnyddiwyd yn helaeth fel porthiant wedi ei falu yn ystod y ddwy ganrif ddiwethaf heb os, ac mae'r disgrifiadau yma yn awgrymu'r rhywogaeth estron mwy ei maint.

Tanwydd a golau: Bu'n gweithio mewn cors (i ladd mawn?) ym Mehefin 1634 *(I made the* ***meares*** *in Gweyn y Car)* a soniodd yn y mis canlynol am gario tyweirch *(a carying deepe turves)*. Cafodd "fenthyg" glo un diwrnod rhewllyd o Ragfyr *(I bor a barrill of* ***coales*** *of Jon pr…frosty mor[ning])* – tybed ai o waith glo Malltraeth, ynteu a oedd glo eisoes yn cael ei fewnforio o dde neu ogledd ddwyrain Cymru i Fôn yr adeg honno? Yn Ffair Aberffraw un mis Mai prynodd haearn i wneud canhwyllau brwyn am 7 ceiniog *(for Iron to make* ***rush Candels*** *7d.)* Yn hwyrach yn y flwyddyn prynodd ganhwyllau hefyd wrth y pwys. Ni ddywedodd o ba wneuthuriad yr oedd y rhain.

Defnydd a Dillad: Yn Ffair Biwmares prynodd gynfas o *Holland*, defnydd bras a ddefnyddiwyd ar gyfer gwneud dodrefn. Anfonodd 5 swllt (pris eithaf drud) at ei frawd am lifo gwlanen *(sent him 5s for dying the* ***flanen****)*, ond cafodd lifo ei het am ddwy geiniog. Difyr yw cofio mai dyma un o'r ychydig eiriau Cymraeg (gwlanen) a gafodd ei fabwysiadu gan y Saesneg (flannel) ac fe welir yma ffurf hanner ffordd. Tybed pa blanhigion a pha brosesau ddefnyddiwyd ar gyfer y llifo – cen cerrig efallai? Dro arall cafodd *straw hatband*.

Celfi ac offer: Roedd yr offer a brynai yn amrywio yn fawr. Prynodd ef, neu ei was *(my man)* ar wahanol achlysuron amryfal fanion at waith y fferm, megis: ysgubau (*beesoms*), "**fysteilian**" (ffust wiail o bosib, sef blaen y ffust a ddefnyddiwyd i ddyrnu ŷd ar y llawr dyrnu), **blaen gwiail galw**, neu "driving rod" mewn un cofnod, (sef y wialen flaenfain, wedi ei gwneud o gollen, a ddefnyddiai'r geilwad i annog ychen yn eu blaenau wrth aredig. Prynodd "**wimblet**" (offeryn saer i wneud tyllau) a *twig voyder* (i wneud offeryn cerddorol efallai, neu ryw declyn arall mwy ymarferol?). Prynodd raffau o flew (ceffyl?) a stribedi o ledr *(bend leather)* i glymu a rhwymo.

Baco: Erbyn cyfnod Robert roedd cysuron baco wedi cyrraedd Môn, y dail weithiau wedi eu malu ar ffurf snisin *(…gave me a* ***sneesing*** *box)*. Cymerai faco gyda chwrw *(took* ***tobacco*** *and beere)* a hynny hefyd fel moddion. Ym mis Mai 1632 roedd yn dioddef o'r ddannoedd, a thalodd geiniog i grwydryn a addawodd wellhad iddo, ond y diwrnod wedyn prynodd faco i'r un perwyl *(I gaue a vagabond a peny wch vndertooke to heal ye toothache)*. Derbyniodd faco fel anrheg *(token)* hefyd.

Enwau lleoedd: Cyfeiriodd at yr enwau lleoedd "llysieuol" hyn: *Penheskin* (hesg), *Ystyfnkegid* (cegid), *Rhyd y Coed*, *Mossoglen*, *Brwynog* a *Keirchiog* (ceirch). Cyfeiriodd at rai cynefinoedd megis *Gweyn y Car* a *Towyn Trevadog*. A beth am yr enw Dronwy ei hun? "Derw ger afon" yw'r ystyr tebycaf. Ac yn fyr i gloi, yr argraff a geir o'r dyddiadur hwn am ei awdur yw mai gwerthwr cnydau ydoedd yn bennaf ond hefyd yn brynwr bwydydd, offer, gwasanaethau a defnyddiau. Nid oedd yn aml-alwedigaethol fel y byddai rhai o radd is mewn cymdeithas yn gorfod bod efallai.

Cipolwg digon niwlog o gynefin Robert Bulkeley a gawn, ac fe ddilornwyd ei ddyddiadur gan mor arwynebol yw llawer o'r sylwadau o'u cymharu â'r dyddiaduron Cymreig a ysgrifennwyd yn ddiweddarach (gan, er enghraifft, un o'i ddisgynyddion, William Bwcle). Ond pwy arall ysgrifennodd am fywyd pob dydd y cilcyn hwn o ddaear yn y cyfnod yma? Ni allwn ond derbyn

cofnodion Robert fel ag y maent, waeth pa mor anghyflawn ydynt, a'u dehongli, gorau y gallwn, fel darlun o gyfnod arbennig yn hanes ein cefn gwlad.

Llaw Dyn yn gymaint â llaw Natur fu'n gyfrifol am greu yr etifeddiaeth wledig yr ydym yn honni ei gwerthfawrogi heddiw, a pherthynas pobl â phlanhigion yn eu hamryfal ffyrdd sydd fwyaf dadlennol o'r hanes hwnnw. Dim ond trwy ddeall sut y gwnaeth pobl ffurfio a thrawsffurfio tirlun ein gorffennol drwy eu gwaith a'u hamdden beunyddiol, y gallwn ddeall yn llawn sut yr esblygodd yr hyn a adawyd i ni heddiw. Dyma ddarn bach o'r jig-so na allwn ei hepgor.

Ewch i wefan Llên y Llysiau a mewnbynnwch y gair *Dronwy* i weld llawer o'r cofnodion a fu'n sail i'r dadansoddiad hwn.

Diolch
Unwaith eto diolch i Mr. a Mrs Ingham, perchnogion Dronwy am eu diddordeb. Diolch hefyd i Tomos Roberts am ei sylw ynglŷn â tharddiad "Dronwy".

17th century Anglesey

In this the second part of the account of Robert Bulkeley's diary (1631-1635), references to the uses of plants for food, drink, fuel, as building materials, clothes and place names are the main subject. Robert was not a pluralist but a relatively specialised arable farmer, a seller of grain of moderately high social standing, and a buyer of most other goods and services. He regularly bought small amounts of apples, pears, plums, onions, and dried fruit in winter. He bought spices which could well have included very exotic ones such as cumin and nutmeg. He appears to have bought numerous dairy products, if that is what he meant by *lactuals*. He liked white bread and used linseed oil and vinegar.

He lived life to the full, and apparently enjoyed a riotous social life of tipples and wassails, the alcohol coming in many forms and for many occasions (including consumption at the one burial a month, on average, which he recorded). Amongst his tipples were braggot (fermented beer and honey), aqua vitae (a brandy-like spirit based on grapes), mead, ale and hop-flavoured beer. He enjoyed tobacco both for smoking and as snuff, for both recreation and for a toothache cure.

He set building contracts involving both slate and thatched roofing, the latter being of marram, bought locally from Aberffro fair. Slates were also quarried locally for the purpose in hand, notably from Henborth. Little has been said so far about sources of non-local produce, but large *(draught)* timber was imported from Ireland through the ports of Cemaes and Glaslyn.

He visited shipwrecks and may have gleaned ('scavenged' might be thought unkind!) from the beach. He otherwise collected sea gravel. He made frequent mention of gorse, to clear land and as a fencing material (but is unclear about its use as fodder, well known until early last century). Was he using the European gorse or the Western gorse, and if the former, was it introduced, and if so when? In this case, its use for fencing suggests the first, and larger species. Ditching was also a routine activity on the wetter land. He dug peat as fuel but also bought coal, though it is not clear whether the latter was imported or whether it came from the Anglesey coalfield at Malltraeth. He made his own rush candles, but also bought candles (of what material one wonders) by the pound.

A coarse cloth known as Holland was bought, as was flannel (a word derived from *gwlanen*), and the latter was sent to his brother to be dyed at considerable expense. He bought instruments of many kinds including flail heads, beesoms, driving rods (for driving the oxen at the plough), and, mysteriously, a twig voyder! A number of botanical place names are mentioned (their origins no doubt long pre-dating Robert's lifetime), including ones referring to sedge, hemlock water dropwort, trees in general, moss, rushes and oats. The name Dronwy itself refers to 'the oaks by the river'. Robert Bulkeley offers us a rare if sparse account of life in early seventeenth century Anglesey. He gives us a valuable glimpse of the countryside of the island in a period when records of everyday life there, as elsewhere in Wales, are scarce. He contributes a small piece to a jigsaw which can show how our present day landscape came to be as it is.

Cwm with a view

Newly acquired dry pasture, Cwm Cadlan. Photo: Mark Watts.

Over thirty years ago, a small patch of unique grassland was notified for its scientific interest. Soon to be declared a National Nature Reserve, it is part of a much larger Special Area of Conservation. ***James Robertson*** *describes an oasis of wildlife on the edge of the Brecon Beacons National Park, and how Cwm Cadlan came to be conserved – a story of conservation 'in progress'.*

Photo: Graham Motley

Sundew and butterwort, Cwm Cadlan.

How do you convey the special nature of one small patch of Welsh countryside? I suppose a list of scientific plant names might be enough to set an audience of botanists leaping out of their chairs. Visual beasts that we are, most of us find photographs provide an instant route to the imagination. I will have a go with words.

Imagine yourself walking beside a small stream. As you climb towards its source, the tinkling sound of running water indicates where first one, and then a second stream join yours, and speed it on its way to join the Afon Cynon. The valley is full of birdsong. If you are lucky, you will find the exquisite white flowers of meadow saxifrage along the banks of your stream, the Nant Cadlan.

The sporadic distribution of shrubs and trees, in dots and dashes, and the curves and irregularities of the field boundaries emphasise the naturalness of this place. You are in the presence of nature. Fields fit into and follow the contours, the stream cuts a notch in the ice-carved floor of the cwm and the vegetation spreads before you in a mosaic of different colours and textures.

This vegetation is extraordinary; the largest stretch of fen meadows in Wales. The constant supply of water on which the fen plants depend is on hand: the small valley drains a large block of high ground. To the north lies the ridge of Cefn Cadlan, which reaches its highest point, at nearly 500 metres, at Cadair Fawr. To the south is Mynydd-y-glog, and the whole area is freckled with cairns and ancient settlements.

The other secret ingredient lies underneath the meadows, for much of the area sits on carboniferous limestone. The geology is complex, with

Monitoring at Cwm Cadlan. Photo: Graham Motley.

millstone grit and Devonian sandstone underlying parts of the site, as well as a covering of glacial drift. The permeable nature of the limestone provides hydrological surprises and uncertainties. It is almost impossible to be sure how water travels through this rock, but every now and then, seepages or flushes show where calcium-rich water has surfaced.

These flushes are carpeted with mosses, and dotted with the yellow rosettes of butterwort leaves, waiting to catch insects. Marsh arrowgrass and bog pimpernel are joined in places by bog-bean, whose trifoliate leaves closely resemble those of their relative the garden broad bean; and by marsh lousewort, whose blistered leaves are often suffused with red, and whose purple flowers appear to emerge from pale bladders.

In many places a thick layer of humus, consisting of the remains of plants, has built up, and the meadows are more typical of neutral grassland. In late summer, bird's-foot trefoil, common knapweed and devil's-bit scabious add splashes of yellow, purple and blue, and three species of lady's mantle contribute lacy yellowish flower heads. As you climb higher, and the influence of the limestone disappears, the fen meadows become rush pastures, purple moor-grass appears, and the vegetation transforms to acid grassland and wet heath. Trees and shrubs still follow the watercourse and frame these higher pastures.

This little valley contains a particular treasure – the golden globes of the perfectly-named globeflower. The population is large – perhaps the largest in this part of Wales, as well as being at one of its most southerly stations in Britain. Other select plants, which are always particular about where they grow, include marsh violet, meadow thistle and a host of different orchids.

A narrow escape

It is good to know that a place of such beauty still exists; and the story of how just one small piece of it has escaped the ravages of half a century of intensive farming to become a National Nature Reserve (NNR) adds an extra piquancy. It is a human story not without drama, and far from concluded.

The value of one corner of this cwm was recognised long ago. Three hectares, or eight acres of old meadows, known as Glyn-perfedd, became a Site of Special Scientific Interest (SSSI) in 1972, and this was listed as a top-grade site in *A Nature Conservation Review*[1], the shopping list for possible National Nature Reserves. Although only a small area received the SSSI accolade, it was apparent then that the surrounding area, and indeed much of the cwm, was special. The traditional practice of taking a late hay crop was then very typical of Welsh upland valley farming.

But traditional agriculture was on the way out. Financial inducements and peer pressure were pushing farming in a more intensive direction during this period. A series of ditches was cut around the SSSI in 1980, which partly dried out several wet, fenny meadows. Cattle gradually gave way to sheep, the last of the cattle being sold in 1997, and sheep numbers, already boosted by the arrival of headage payments, boomed.

Globeflower leaves Photo: Graham Motley.

In 1995 the tale took another twist. The owners of the nearby quarry were given approval to deepen the quarry below the water table, so that it would require constant 'de-watering'. To give early warning of any problems which this was causing the SSSI, the quarry company undertook to monitor water levels and vegetation, mainly on Glyn-perfedd land.

In 2000 the owner, who had been thinking about selling some of the SSSI to the Countryside Council for Wales (CCW), died suddenly. Without a will, it took a while before his widow inherited the estate. She decided she did not want to farm all the land, and sold CCW not only the much extended SSSI land which she owned, but also some additional dry pasture, which will make managing the site much easier.

The land CCW has acquired has a bit of everything – tall and short, wet and dry, from rank patches of meadow sweet, alder wood, hazel and bracken scrub, to fen and flush. The additional dry pasture is different again, and has its own special value. This autumn sixteen species of waxcap, a group of colourful fungi for which Wales is famous internationally, and which are excellent indicators of low nitrogen pollution, have been found in these fields.

Old trackway reopened. Photo: Mark Watts.

Challenges ahead

Having acquired the original SSSI land and adjacent dry pasture, CCW has the straightforward task of declaring it a National Nature Reserve, and the much harder task of managing it to the highest standard. The key will be to protect the water regime from any adverse effects which, for example, could result from the deeper quarrying; and to manage the grazing in the optimum way.

So far, work has concentrated on repairing and replacing sections of the boundary fences, clearing an old stone-banked access track which had become overgrown and constructing a track to allow machinery to reach the full extent of the site. A bridge over the Nant Cadlan, about 18 metres long, is currently under construction, which will provide dry and safe access for people and machinery.

New bridge under construction. Photo: Mark Watts.

Perhaps the most significant step forward for the conservation of these flower-filled meadows is the restoration of cattle grazing (which for many years had been part of the traditional farming regime at Cwm Cadlan). Thanks to a neighbouring farmer, a suckler herd was brought onto the site from June to November. Getting the grazing level right each year will be quite a challenge as the amount of grazing can be quite different depending on the weather and soil conditions.

Now that machinery can get onto the site, some areas will be topped to control rushes and other tussocky vegetation, and thistles and bracken controlled within the drier grassland. The presence of scrub and trees within the marshy grassland will be monitored and controlled if necessary. In the long term it is hoped that some of the drainage ditches can be filled in, but when this happens will depend on the outcome of further monitoring.

Although there is no public access to the site at the moment, this will change once safety issues have been resolved and the necessary infrastructure put in place (within two years).

Looking across the valley from Blaen Cynon. Photo: Mark Watts

The NNR lies at one end of the cwm. The SSSI now covers much of the cwm, approaching 90 hectares. It follows the stream up the valley, and includes the best globeflower meadows. At the other end of the valley, where the stream turns south and the land becomes more heavily wooded, are four additional parcels of SSSI land. These make up the Blaen Cynon candidate Special Area of Conservation, and include a population of one of Europe's most threatened and rapidly declining butterflies – the marsh fritillary. CCW has been fortunate enough to acquire some of this land. Formidable management issues waiting to be tackled include the clearing of a plantation; the story of which will feature in a future article.

James Robertson is editor of *Natur Cymru* and works for CCW as its author and editor.

Reference

1 Ratcliffe, D (Ed) 1977 *A Nature Conservation Review.*

Marsh lousewort and butterwort. Photo: Graham Motley

Hud a her Cwm Cadlan

Awyrgylch hudolus a hynafol sydd yng Nghwm Cadlan, ger Parc Cenedlaethol Bannau Brycheiniog. Yma ceir yr ardal fwyaf o ddolydd ffen yng Nghymru. Mae'r ddaeareg yn gymhleth a'i dylanwad i'w gweld yn glir ar gynefinoedd y dyffryn, sydd hefyd yn cynnwys porfa frwynog, gweundir a glaswelltir asidaidd. Mae'r planhigion amrywiol yn cynnwys y gronnell ac 16 o ffyngau cap cwyr. Ym mhen pellaf y cwm mae poblogaeth o löyn byw prin brith y gors.

Dynodwyd hen gaeau Glyn Perfedd yn Safle o Ddiddordeb Gwyddonol Arbennig nôl yn 1972, ond oherwydd newidiadau amaethyddol a datblygiad y chwarel gyfagos, nid oedd dyfodol bywyd gwyllt Glyn Perfedd yn ddiogel. Daeth y caeau, a rhagor o dir o'u cwmpas, i feddiant CCGC yn 2000. Nawr, rhaid i'r corff hwn gynnal diddordeb y tir trwy reolaeth. Roedd ail gyflwyno gwartheg yn allweddol, fel ag yr oedd codi pont dros Nant Cadlan, fel y gallai peiriannau fynd i'r safle i dorri brwyn ac ysgall ac ati. Ond mae sawl her arall yn dal i wynebu'r CCGC – gan gynnwys clirio planhigfa a sicrhau na fydd chwarela yn ymyrryd ar lefel y dŵr a phatrwm draeniad y safle.

Montgomery Canal *through the lens*

Vyrnwy Aqueduct. Photo: Jonathan Briggs.

Canals were created with no thought for nature or leisure, but they provide both in this post-industrial age. Yet the idyll of languorously bobbing in a boat entertained by kingfishers is not so readily achieved: it takes effort to stop time and nature from drying canals out, or to prevent the onrush of motorised human activity from taking them over. This tension, as ***Jonathan Briggs*** *explains, has shaped the history of a very special wildlife paradise, the Montgomery Canal.*

The Montgomery Canal is definitely the best canal in Britain. Some suggest the Basingstoke is better, but the Monty's miles ahead. I'm talking in biodiversity terms of course. In navigation terms it is, at present, definitely substandard – and that's where the problems begin.

My own involvement with the canal started exactly 20 years ago in January 1985. For three years I managed the canal survey and experimental reserves project and I remained involved until the mid-1990s. I still work for British Waterways (BW) and in canal restoration issues, but I am no longer involved in the Montgomery and the views expressed here are my own.

Biodiversity value

The Monty is of national importance for its great diversity of water plants, including many rarities. The best known are floating water plantain, and what may be most of the UK population of grass-wrack pondweed. Both species can be viewed together at Vyrnwy Aqueduct, a classic Monty location. Other notable aquatic macrophytes include flat- and long-stalked pondweed and autumnal starwort. Some are at the extremes of their national distributions on the canal. Locally scarce species include water violet, reddish pondweed and frogbit. There are also 45 species of water beetles, 18 waterbugs, 12 mayflies, 18 caddisflies, 22 aquatic molluscs and 15 odonata, including white-legged damselfly and club-tailed dragonfly.

There is a long tradition of angling on the canal, and a good range of fish – roach, pike, perch, tench, bream, rudd, chub, dace, carp, gudgeon, minnow, stone-roach, stickleback and eel all occur.

Though famous for rare and diverse aquatics, the Montgomery is also significant for the diversity of plants growing on the thin habitat strips running along the towpath from the hedgerow, across the path and onto the channel margins. Studies in the 1980s confirmed 437 vascular plants here. Terrestrial invertebrate surveys in the same period recorded 336 species of insect with 22 locally or nationally scarce ones (including bugs, true flies, wasps and beetles). Thirty-five species of terrestrial snail and 23 species of butterfly were also recorded.

The canal is relatively 'average' for waterbird species, but may have more significance for terrestrial birds using the corridor habitats. About 75 bird species have been recorded as breeding here. There are relatively few data for mammals, but bats and other small mammals use the corridor and otters visit the canal where it runs next to or crosses rivers. Grass-snakes and slow-worms occur, as do all the commoner amphibian species.

Vegetation on the towpath. Photo: Jonathan Briggs.

Canal history – and nomenclature

I should first define what is meant by 'Montgomery' Canal as it doesn't now, and never did, go to Montgomery. The Montgomery is a 55km long canal starting at a junction with the Llangollen Canal at Welsh Frankton in Shropshire, passing through Maesbury Marsh to the border at Llanymynech and then alongside the Severn to Welshpool and Newtown. Historically it is three separate canals, built by different companies and opening in 1796, 1797 and 1820. Each was built largely for agricultural purposes – carrying and distributing lime (or limestone for lime-making) from the quarries at Llanymynech. Old limekilns remain a constant feature of the canal wharves.

Canal in use.

The canals became part of the Shropshire Union Canal (SUC) company in later years, and were labelled as such on OS maps until quite recently. This is particularly awkward for biological records as the SUC proper is entirely different, and vague records for the 'SUC' could apply anywhere within a considerable mileage. These days canal purists tend to use Montgomery*shire* Canal for the original three canals but the modern formal name is 'Montgomery'.

Post-war history

In the post-war nationalisations the canal, already closed, became the property of British Transport Waterways (BTW, now British Waterways – still a nationalised company). BTW's brief was to review and dispose of surplus, unwanted and uneconomic waterways – and the Montgomery was high on their list. Around the same time the Inland Waterways Association (IWA) was established as a campaigning body to reverse the decline of canals and encourage renewed use, both for freight and pleasure traffic. They are widely credited with helping save the Llangollen Canal but struggled to make a similar case for the Montgomery.

Many similar canals were sold or infilled during the 1950s but miraculously most of the Montgomery line survived. In Shropshire some lengths were drained but not sold, and in Wales, where the canal was river-fed by the Tanat and the Severn, most survived in water. Main highway bridges were removed, with the canal piped instead, severely restricting ambitions to restore through-navigation. Under the 1968 Transport Act the canal was classified as 'Remainder' – not for commercial or cruising use. This restricted how much BTW could spend on it, but preserved the channel

for drainage purposes. In 1967 the newly formed Shropshire Union Canal Society (SUCS) began campaigning to restore navigation, catalysed by proposals to use the canal line in Welshpool for a town bypass. The SUCS/IWA Big Dig of 1969 succeeded in reopening the short Welshpool length and was followed in the 1970s with a Prince of Wales Committee Project to restore a longer section north of the town. By 1980 the restoration was well underway, but limited to a few isolated sections.

The alternative history

Most conventional histories carry on with the restoration story at this point – but there is an alternative natural history story to tell as well. This begins in the 19th century with various pondweed and mollusc data. By the 1930s there were several studies of mollusc distribution and records of floating water plantain and unusual dragonflies. J.A.Webb's unpublished 1941 *Montgomeryshire Flora* listed seven true pondweeds for the canal, including grass-wrack pondweed. Surveys in the late 1940s added 14 dragonflies and 26 water beetle species.

There is a good contemporary description in Thurlow Craig's angling classic *Spinner's Delight* (1951). He talks of a heavily silted canal, full of weed and fish, with towpaths so quiet that swans nested on them. He was particularly keen on the Guilsfield Arm, observing swans, herons, stoats, kingfishers, grass snakes – and of course the copious 'weed'. That 'weed' set the scene for a 1950s and 60s campaign to save the canal for wildlife, rather than navigation.

Water violet. Photo: Jonathan Briggs

Minnow Phoxinus phoxinus. Photo: CCW.

In 1955, the Nature Conservancy decided to notify parts of the Welsh length, including the Guilsfield Arm, as a SSSI. But as we've seen, BTW's brief at the time was to 'dispose' of unwanted waterways – and since SSSIs were then virtually unprotected, the wildlife interest was clearly threatened. The NC were effectively powerless, but the Montgomeryshire Field Society (MFS), and particularly their secretary Janet Macnair, decided to act. A letter-writing campaign to BTW and Government committees led to a meeting between Macnair, the NC and BTW, where BTW outlined plans to close the Tanat feeder and, incidentally, permanently drain the SSSI length. They were however prepared to sell these sections to the NC or the MFS! On reflection neither could afford the (£400) purchase, or maintenance costs.

Progress was slow over the next decade or so, for although BTW were happy to meet the conservation campaigners, who now included Bill Condry, there was a lack of money or means to bring things to a conclusion. Condry advised that it was best to get control of some sections, and accept that others could not be part of a reserve. A 1974 survey of the Welsh SSSI sections found most to be overgrown with reed grass and trees but that, where restoration-led clearance work had been done, this was 'clearly beneficial' in maintaining diversity. But where similar clearance on other canals had been followed by boat traffic, ecological value declined. The concept of transferring critical species from one length to another was actively discussed, but the Guilsfield Arm, the obvious location, was overgrown and denotified as a SSSI. The problem was at last being clarified: the canal needed management, but not many boats. But without any boats it wasn't likely to be managed. The answer had to be reserve areas, boat-free, but with management.

Cardinal beetle. Photo: Jonathan Briggs.

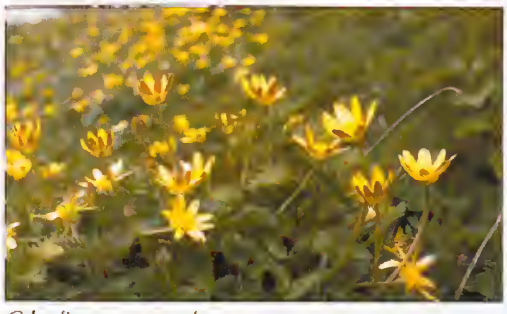
The 1980s conservation initiatives

By the 1980s BW, unlike their predecessor BTW, had become actively interested in restoring the canal and began to take a lead. The 1981 Wildlife Act gave SSSIs fuller protection, and the (renamed) Nature Conservancy Council moved to reassess and re-designate the canal. A new SSSI in Shropshire covered the Rednal to Aston Locks length, and in Wales the long length from Carreghofa to Welshpool – including the sections rehabilitated in the 1970s – was notified. The Guilsfield Arm, still overgrown, was excluded. The new SSSIs covered 23km of canal, and were designated for overall diversity (including towpath habitats), not just the rarities. The lessons of the 1960s and 70s were noted, and the NCC accepted that management was needed, but that this inevitably meant restoration. BW and NCC agreed that they would jointly seek to understand the ecology of the canal and establish a series of navigation-free 'offline' reserves. A team of graduate specialists undertook terrestrial and aquatic surveys, electro-fishing studies and breeding bird surveys, and practical work on a number of experimental offline reserves. The project began in January 1985.

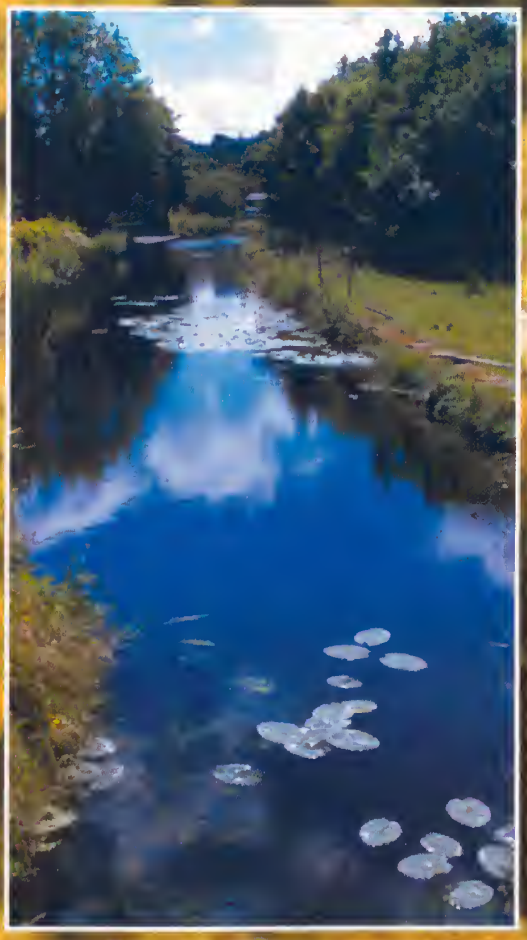
The results of the baseline surveys were remarkable; all the old species records were confirmed and many new notable species recorded. The data demonstrated the diversity of the canal, with a huge variety of species in marginal and towpath habitats as well as the canal channel.

Reserves work began at Rednal Basin in Shropshire, with major tree clearance to reduce water shading. Transplanting techniques were developed for key macrophytes and monitoring schemes set up. Results were mixed: some species thrived, others didn't, and there were many problems with invasive species (particularly *Elodea*). In 1986 the first section of the Guilsfield Arm was tackled, starting with mechanical dredging and towpath clearance to remove overgrowth of trees and reed-grass. Results were initially spectacular with many macrophytes recovering spontaneously. More transplants followed, again with mixed success, but with increasing experience and confidence. The works here were so successful that it was soon re-notified as a SSSI. Other reserves were also developed, include a newly dug channel fed by canal water at Wern Claypit.

At the same time BW and the Restoration Trust were busily fundraising for restoration and promoting a Private Bill to enable the works, and were anxious to secure NCC's blessing. This was duly given, on condition that a series of reserves be created, dotted along the canal to reflect the differing species distributions, covering the full range of habitats (not just the water channel) and varying in size. The final list took some time to establish, partly because of landowner opposition where land acquisition was needed. It included 18 sites, the largest being the whole of the Guilsfield Arm. It also suggested that the channel restoration works should endeavour to incorporate habitat features, such as soft bank protection and diverse towpath verges, throughout the canal. This 'reserves agreement' became a part of the Bill and subsequent British Waterways Act 1987.



Celandines on a towpath.. Photo: Jonathan Briggs.



Near Vyrnwy. Photo: Jonathan Briggs.

Gatekeeper. Photo: Jonathan Briggs.

Harvesting long-stalked pondweed for transplanting.
Photo: Jonathan Briggs.

Rudd Scardinius erythrophthalmus. Photo: CCW

Frogbit. Photo: Jonathan Briggs.

The reserves list and programme assumed that restoration would start immediately, with works running over a 5-year north-south programme. But this was not to be. The Welsh Office unexpectedly declined to allocate European funds, and the restoration programme abruptly halted in 1988. Staff and funding vanished, and work stopped on the reserves already in development. Minor works continued on some sites, as budgets allowed, and basic monitoring continued into the 1990s. It was no surprise to find that the reserves were losing diversity through overgrowth, but retained pockets of critical species in small areas. It was also clear that some sites were much too small to be critically important, though still valuable as habitat fragments.

Confusing times in the 1990s

The 1990s began as a period of some confusion for the canal reserves and SSSIs. A belief grew within nature conservation ranks that the reserves hadn't worked, based on casual visits to the overgrown sites. An opposite belief grew within the restoration lobby – the reserves programme was revolutionary and had 'solved' the SSSI dilemma both here and on other canals. Both beliefs were wrong: the reserves had simply shown a possible way forward for both sides, but communication and understanding on the subject declined for a while within restoration circles.

Yellow flags at water's edge. Photo: Jonathan Briggs.

There was considerable opportunistic restoration work, but the Reserves agreement wasn't designed for this: the trigger points for construction were all linked to an ordered five year plan, not random works. There's a moral there for future agreements!

Another significant problem was the style of restoration work. The new Frankton to Rednal section used a minimalist channel design, with none of the wider habitat features originally envisaged in the 1980s philosophy and NCC agreement. The situation was so far from ideal that in 1997 the Shropshire Wildlife Trust decided to commission a critical survey and leaflet, advocating a more informed approach. This initiative typified the communication problems in the absence of overall plans that fitted the nature conservation needs in the new situation. A new strategic approach was attempted in 1998, with a major funding bid to the Lottery. Though this failed, it did demonstrate the need for a new way forward and led to the formation of the Montgomery Canal Partnership and, ultimately, the recent Conservation Management Strategy (CMS).

Moving goalposts

Goalposts, particularly in the nature conservation world, never stay still, and the 1987 agreement soon started looking dated regardless of restoration progress. Habitat creation techniques have become much more advanced, and conservation ethics and the legal situation have moved on too. Floating water plantain, a key species both within and beyond the SSSI lengths, became fully protected in 1998, bringing a new legal complication to the reserves concept. The UK BAP classifies this species and grass-wrack pondweed as Priority Species, with individual Action Plans specifically seeking to halt site loss. BW, as owners of the principal sites for these species, are UK Lead Partner for both.

More recently the SSSI in Wales was extended to cover the whole canal, and has been designated a candidate SAC under the Habitats and Species Directive. Another significant change is the CRoW Act, which gives BW a duty to positively manage the SSSIs. All these changes hugely complicate the 1987 Reserves Agreement, and finally demonstrate that it is no longer sufficient.

The partnership and the future

The Montgomery Canal Partnership was formed in 1999. Led by British Waterways, it is a consortium of local authorities, canal bodies, statutory agencies and wildlife trusts. It aims to restore the Montgomery Canal, with a focus on rural regeneration; to protect the canal's unique environment; and to increase access.

The Partnership secured Heritage Lottery funding towards a new CMS and the public consultation draft of this was launched in April 2004. It reviews and reassesses all the issues and data, including landscape and built heritage issues (the canal has a remarkable 127 Listed Structures), as well as nature conservation and recreational concerns. A new study of macrophytes and invertebrates was commissioned for the Strategy, and this again confirmed the special nature of the wildlife. There was also a new assessment of the impacts of boat traffic, which confirmed that critical species were likely to decline, even with modest boat traffic, so the need for boat-free areas remains clear.

The Strategy sets out ecological principles, which include environmentally creative engineering, nature reserves based on need rather than ease of land availability and managed recreational use to ensure no loss of wildlife value. There are new reserve guidelines, developing the 1980s concept, but stressing that larger areas are likely to be required, and proposals for controlled boating. All interested parties need to be made aware of the strategy. Recent (somewhat naïve) comments in the wildlife press (and by some politicians) seem ignorant of it. It should be recognised as the way forward, putting into modern context all the issues first raised so long ago – the special interest, the need for management and investment, and the recognition that this is inevitably tied to recreational use.

Jonathan Briggs is Environment Manager with British Waterways' Regeneration Team in Gloucester.

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Slow-worm.
Photo: Jonathan Briggs.

Trip ar gamlas Maldwyn

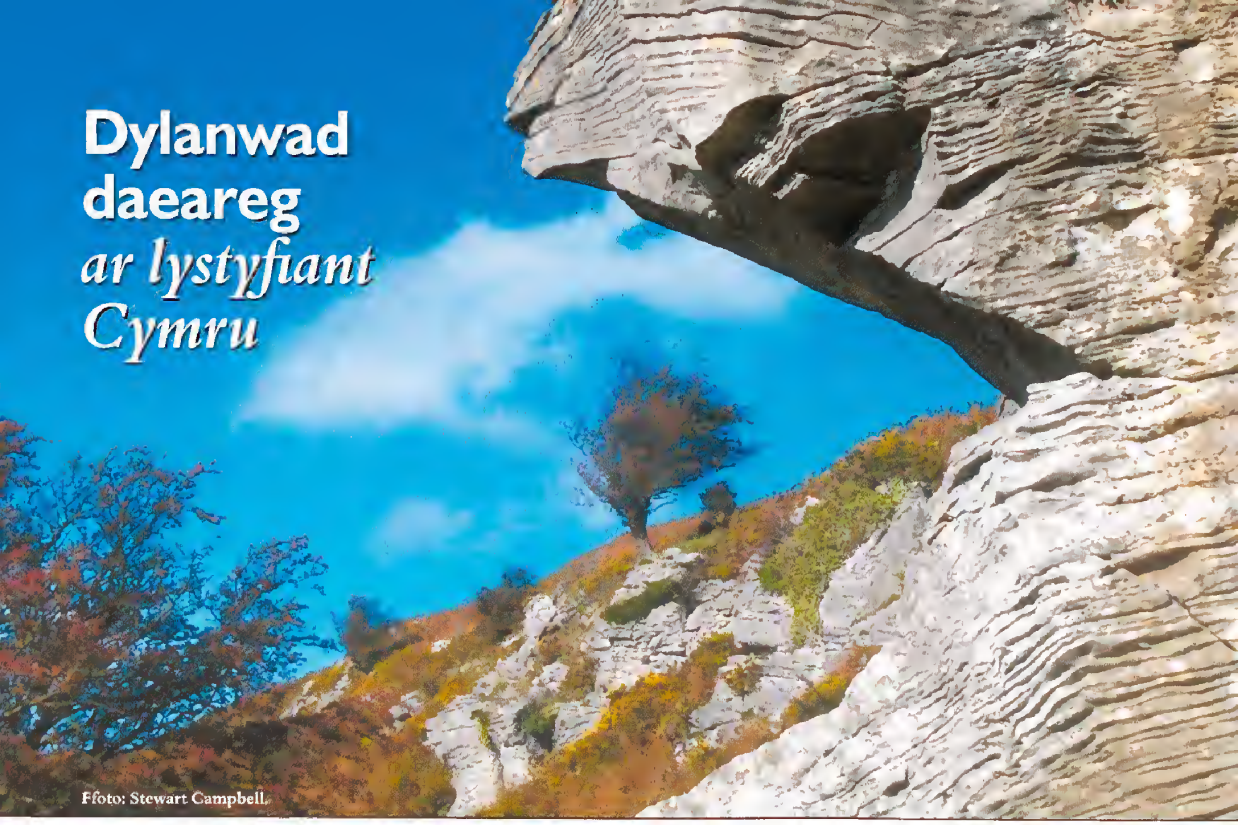
Camlas Maldwyn yw'r gamlas orau ym Mhrydain ar gyfer bywyd gwyllt. Cofnodwyd tua 500 o blanhigion yma, gan gynnwys rhai prin fel llyriad-y-dŵr arnofiol a'r dyfrllys cywasg. Mae yma hefyd gannoedd o greaduriaid di-asgwrn-cefn, a nifer dda o wahanol adar a mamaliaid.

Bu'r gamlas 55km yn segur am gyfnod wedi'r ail ryfel byd a dechreuodd ymgyrch i'w hail agor yn 1967. Cychwynnwyd ymgyrch ar yr un pryd i'w hachub ar gyfer bywyd gwyllt yn hytrach na chychod. Ar ôl hir drafod, daeth yn amlwg fod angen gwaith rheolaeth, ond fawr ddim gweithgaredd cwch, er mwyn cynnal y bywyd gwyllt. Cytunodd British Waterways (BW) a'r Cyngor Gwarchod Natur yn y 1980au mai'r ateb oedd creu gwarchodfeydd ar hyd y gamlas. Cafodd y cytundeb hwn ei gynnwys mewn deddf a basiwyd i hybu'r gwaith adfer. Cymysg oedd y canlyniadau cynnar wrth greu'r gwarchodfeydd a chafwyd anawsterau wrth geisio gweithredu yn unol â'r weledigaeth wreiddiol.

Erbyn y 1990au roedd gwahaniaeth barn am y gwarchodfeydd, gyda chadwraethwyr yn eu hystyried yn fethiant ac eraill yn eu gweld yn fodd i ddatrys pob problem amgylcheddol ar gamlesi. Erbyn sefydlu Partneriaeth Camlas Trefaldwyn yn 1998 roedd cytundeb 1987 wedi dyddio oherwydd datblygiadau mewn technegau creu cynefin, newidiadau mewn meddylfryd cadwraethol a deddfwriaeth newydd. Mae'r darn Cymreig o'r gamlas bellach yn SoDdGA ac yn safle o bwysigrwydd Ewropeaidd, a rhaid i BW bellach reoli'r gamlas yn gydnaws â gofynion cadwraethol. BW hefyd sy'n arwain Cynlluniau Gweithredu Bioamrywiaeth ar gyfer dwy o rywogaethau prin y gamlas.

Mae gweledigaeth y Bartneriaeth heddiw yn cwmpasu adfer y gamlas mewn dull cynaliadwy, hybu adfywiad gwledig, gwarchod amgylchedd naturiol ac adeiledig y gamlas a chynyddu cyfleoedd addysg a mynediad. Cadarnhawyd yn 2001 bod angen cadw darnau yn rhydd rhag cychod ac mae'n debyg y bydd angen gwarchodfeydd ehangach yn y dyfodol.

Dylanwad daeareg *ar lystyfiant Cymru*



Ffoto: Stewart Campbell.

Mae un cipolwg ar fap daearegol amryliw Cymru yn dangos pa mor amrywiol yw'r creigiau sydd o dan ein traed. Dim ond mewn ychydig iawn o leoedd ar hyd a lled y byd y gwelir yr un amrywiaeth daearegol o fewn ardal gymharol fach. Yn yr erthygl hon mae ***Raymond Roberts*** *yn ystyried dylanwad sylfaenol y daeareg ar lystyfiant ein gwlad.*

Duegredynen y muriau/Wall rue.
Ffoto: Michael Hammett.

Hawdd yw anghofio weithiau yr effaith sylfaenol y mae daeareg yn ei gael ar y tirlun ac ar y llystyfiant. Pe bai'r map daearegol yn unlliw yn hytrach nag yn amryliw byddai Cymru llawer tlotach o rhan ei thirwedd a'i llystyfiant, heb sôn am ei mwynau a'i cherrig. Gall y creigiau ddylanwadu ar y tirlun mewn sawl ffordd; yn wir, daeareg sydd yn aml yn penderfynu lleoliad ein trefi a'n pentrefi – er enghraifft, mae ystyriaethau fel cysgod, agosrwydd at ffynhonnell o ddŵr, mwynau, priddoedd ffrwythlon a mannau croesi cyfleus i gyd yn dylanwadu ar batrwm anheddu. Pan ystyrir dosbarthiad planhigion daw nifer o ffactorau dylanwadol i rym, gan gynnwys uchder, llethr, cyfeiriadedd, hinsawdd, pridd – heb anghofio rheolaeth gan ddyn. Rhaid derbyn mai creigiau sydd yn ganolog i nifer o'r ffactorau hyn.

Mae creigiau hynaf Cymru yn dyddio o'r cyfnod Cyn-Gambriaidd (tua 600 miliwn o flynyddoedd yn ôl). Gellir dod ar draws creigiau o bron bob cyfnod daearegol dilynol hyd at y cyfnod presennol, sef y Cyfnod Cwaternaidd, yn ein gwlad fach. Yr unig gyfnod nad yw i'w weld yng Nghymru yw'r Cyfnod Cretasig. Mae'r amrywiaeth o ran oedran y creigiau, ynghyd â'r prosesau gwahanol sydd wedi dylanwadu ar y tirlun, wedi bod yn gyfrifol am greu cynefinoedd di-rif ar gyfer planhigion – er enghraifft, ar dywodfaen, calchfaen, gwenithfaen a gwastraff metelifferaidd. Felly, gyda'r fath amrywiaeth anhygoel o greigiau, does bron unman cystal â Chymru i ddangos y cysylltiad rhwng daeareg a llystyfiant.

Creigiau Eglwyseg, Rhiwabon a'r Mwynglawdd

Safle gwych i weld effaith daeareg ar y tirlun a'r llystyfiant yw sgarp Eglwyseg, ger tref Llangollen. Mae'n 8km o hyd ac yn codi dros 450m o uchder mewn cyfres o stepiau. Mae'r sgarp yn wynebu'r gorllewin ar y cyfan, ond yn tueddu i wynebu'r de-orllewin yn y rhan ddeheuol. Calchfaen Carbonifferaidd yw'r graig ac fe'i crëwyd rhyw 330 miliwn o flynyddoedd yn ôl mewn môr, bas trofannol. Mae'r cwrel a'r cregyn môr, megis braciopodau, yn dystiolaeth o'r amgylchfyd a fodolai bryd hynny, a gwelir creigiau tebyg yn cael eu creu mewn ardaloedd trofannol heddiw. Ar hyd llawer o'r sgarp gwelir sgri calchfaen; dyma yn wir yr esiampl orau ohono drwy Brydain. Mae'r sgri wedi casglu wrth droed y clogwyni calchfaen wrth i filiynau o ddarnau onglog gael eu disodli o ganlyniad i'r prosesau rhewi-dadmer sydd wedi bod ar waith ers diwedd yr Oes Iâ ddiwethaf, tua 11,000 o flynyddoedd yn ôl.

Wrth ddringo dros y sgarp tuag at y Mwynglawdd mae'r graig yn newid. Mae'r calchfaen yn diflannu a cheir Tywodfaen Cefn-y-fedw ('Millstone Grit') yn ei le. Yn lle clogwyni serth ceir llwyfandir eang gydag ond ychydig iawn o'r graig yn brigo i'r wyneb. Yma ac acw ar y gorwel gwelir tomenni o gerrig. Tomenni gwastraff y gweithfeydd plwm yw'r rhain. Yn y gorffennol bu mwynwyr yn cloddio lawr drwy'r tywodfaen ac i mewn i'r calchfaen oddi tanodd er mwyn cyrraedd y gwythiennau o fwyn gwerthfawr, gan greu ar yr un pryd y tomenni hyn, sy'n gymysgedd o galchfaen a thywodfaen yn ogystal â mwynau plwm a sinc.

Cerddinen/Whitebeam Ffoto: Stewart Campbell.

Sut, felly, mae'r llystyfiant yn ymateb i'r newidiadau yn y creigiau a'r tirlun trawiadol yma? Yn y sgri calchog gall yr amgylchedd fod yn arw ac yma ceir amrywiaeth o rywogaethau arloesol sydd, yn eu tro, yn cynnig cysgod i rywogaethau sy'n sensitif i rew a phori. Yn y mannau hyn fe welwch redynau fel marchredynen y calchfaen *(Dryopteris submontana)*, rhedynen y calchfaen *(Gymnocarpium robertianum)* a duegredynen gwallt y forwyn *(Asplenium trichomanes)* a nifer o fwsoglau, gan gynnwys y Neckera creisionllyd *(Neckera crispa)* a'r Tortela troellog *(Tortella tortuosa)*. Fel yr awgrymir gan yr enwau Cymraeg, mae nifer o'r planhigion yma yn ddibynnol ar galch, neu yn debygol o gael eu darganfod ar galchfaen. Ar y clogwyni uwchlaw'r

Llystyfiant rhostir a'r tywodfaen/Moorland vegetation on sandstone. Ffoto: CCGC.

Sgarp Eglwyseg/Eglwyseg escarpment. Ffoto: Stewart Campbell.

Pig-yr-aran ruddgoch/Bloody cranesbill. Ffoto: CCGC

sgrïau ceir fflora mwy amrywiol ac mae nifer o'r planhigion yn tyfu yn yr holltau a'r agennau sy'n nodweddu calchfaen. Mae'r llystyfiant casmoffytig hwn yn cynnwys rhywogaethau fel duegredynyen y muriau *(Asplenium ruta-muraria)*, gwylaeth y fagwyr *(Mycelis muralis)* a'r heboglys prin *(Hieracium cambricum)*. Nodwedd drawiadol o'r sgarp serth yw'r coed sydd yn tyfu yn rhai o'r holltau, megis criafolen ac ywen. Yma hefyd gwelir un o goed cynhenid prin Prydain, sef cerddinen Lloegr *(Sorbus anglica)*. Mae'n bosib fod y gerddinen yma ar sgarp Llangollen yn rhywogaeth unigryw.

Cynefin prin arall sydd yn ddibynnol ar ddaeareg yw palmant calch ac mae darnau bychan o'r cynefin hwn yn bodoli o amgylch Eglwyseg. Ar anterth yr Oes Iâ ddiwethaf, rhyw 18,000 o flynyddoedd yn ôl, crafodd y rhewlifau y calchfaen yn lân gan adael y graig noeth yn agored i'r elfennau. Dros y 10,000 o flynyddoedd diwethaf mae'r rhew a'r glaw wedi hindreulio wyneb y graig, ac oherwydd y gwendidau yn y calchfaen mae'r glaw asidig wedi creu sianelau neu galchrychau ('grykes'). Rhwng y greiciau ceir blociau o galchfaen sy'n cael eu galw yn 'glintiau'. Yn y greiciau dwfn ceir microhinsawdd llaith a chysgodol; yn y byd cudd hwn mae planhigion cain megis briwydd y calch *(Galium sterneri)*, crwynllys yr hydref *(Gentianella amarella)* a thafod yr hydd *(Phyllitis scolopendrium)* yn llwyddo tyfu'n ddiogel. Mewn mannau ar hyd y garreg lwydaidd gwelir clytiau o flodau coch Pig-yr-aran ruddgoch *(Geranium sanguineum)*. Mae'r prosesau daearegol a greodd ardal arbennig Eglwyseg ac a ffurfiodd gynefinoedd i'r planhigion hyfryd hyn wedi gofyn, felly, am gyfuniad o fôr trofannol i greu'r calchfen yn y lle cyntaf, craig fregus ei natur, dylanwad rhewlifiant a hefyd hindreuliad.

Uwchben y sgarp mae'r tirlun a'r llystyfiant yn newid eto. Yn sydyn mae'r garreg lwyd yn diflannu ac yn wir does dim llawer o'r ddaeareg i'w gweld o gwbl. Gweundir eang sydd yn ymestyn tuag at Y Mwynglawdd yw Mynydd Rhiwabon. A'r rheswm pennaf dros ffurf arbennig y dirwedd yma, unwaith eto, yw'r graig oddi tanodd. Tywodfaen Cefn-y-fedw, sy'n llawn cwarts, sydd dan wyneb yn yr ardal hon.

Ychydig iawn o galch sydd yn y graig, ffaith sydd yn cael ei hadlewyrchu yn y llystyfiant. Rhostir sydd yma yn bennaf, gyda grug *(Calluna vulgaris)*, grug croesddail *(Erica tetralix)* a llus *(Vaccinium myrtillus)*, a chlytiau o orgors yn cynnwys plu'r gweunydd *(Eriophorum angustifolium)*, grug a migwyn *(Sphagnum spp)*.

Tuag at Y Mwynglawdd mae pwysigrwydd y ddaeareg i ddyn yn amlwg ac mae'r gweithgaredd diwydiannol a ddigwyddodd yma, yn ei dro, wedi creu cyfleon i blanhigion. Mae'r tomenni gwastraff, sydd yn cynnwys mwynau plwm a sinc (megis i galena a sffalerit), yr hen odynau calch a'r hen chwareli, i gyd yn cynnig cynefinoedd gwahanol. Hefyd defnyddir nifer o'r hen weithfeydd gan ystlumod fel clwydfannau i gysgu ynddynt dros y gaeaf. Ymhlith y rhywogaethau sydd yn bresennol yma mae'r ystlum pedol lleiaf *(Rhinolphus hipposideros)* sy'n anghyffredin ym Mhrydain.

Dim ond un enghraifft yw ardal Eglwyseg a Mynydd Rhiwabon o'r dylanwad mawr y mae daeareg yn cael ar dirlun a llystyfiant. Mae'r dylanwad yn glir, os ydych yn barod i edrych! Yn yr un ffordd ag y mae daearegwyr yn gallu defnyddio newidiadau yn y llystyfiant wrth fapio creigiau, efallai gallai botanegwyr wneud mwy o ddefnydd o ddaeareg er mwyn mapio dosbarthiad planhigion?

Diolch i **Julie Creer** am y cymorth botanegol.

Mae **Raymond Roberts** yn Swyddog Gwyddor Daear gyda Cyngor Cefn Gwlad Cymru ac yn gweithio ar safleoedd daearegol ledled gogledd Cymru.

Clogwyn a sgri/Cliff and scree. Ffoto: Raymond Roberts.

Draenen wen/Hawthorn. Ffoto: Stewart Campbell.

The influence of geology on vegetation

A quick glance at the multi-coloured geological map of Wales will give you an idea of the variety of rocks beneath our feet. There must be few areas in the world where you'd find such geological diversity in a comparatively small area, and this is reflected in the varied landscapes and habitats of Wales. An excellent site to view the influence of geology on landscape and vegetation is the Eglwyseg Escarpment and Ruabon Mountain in north-east Wales. The spectacular limestone escarpment has extensive areas of scree and steep cliffs, as well as small areas of limestone pavement, an example of geological processes providing different habitats. Heading eastwards over the escarpment towards Minera, the underlying geology changes to Cefn-y-fedw Sandstone ('Millstone Grit'), hence the acidic moorland vegetation. Closer to Minera, spoil tips from the disused lead mines provide a different substrate of limestone, sandstone, and lead and zinc minerals. Although it may be a biased view of a geologist, the reliance of vegetation on geology is under-appreciated.

Down on the **reserve**

Western gorse on Carnedd Meibion Owen. Photo: David Wheeler.

Above the ancient, gnarled oak wood at Tycanol, on the north Pembrokeshire coast, is a boulder-strewn heath. The efforts of a few ponies were failing to control burgeoning gorse and bracken, into which the boulders and their unique collection of lichens were submerging. ***Iestyn Evans*** *was given the job of retrieving the situation.*

Lichen encrusted rocks. Photo: Jim Clark.

During the interview for my present post, I was given this scenario: a boulder-strewn area of land is in need of some gorse clearance. I couldn't use any herbicide due to the high lichen interest, I couldn't use any large machines as they would damage the boulders and I couldn't leave the leftover material behind on site. I thought to myself, what a nightmare. It was only after I had successfully got the job that I found out that this site did actually exist and that I would be responsible for assisting in its management.

Tycanol National Nature Reserve is situated on the northern slopes of Mynydd Preseli, within the Pembrokeshire Coast National Park. The site is split into three parts; the lower part is a wet woodland with many small spring-fed streams running through it, and is known as Hagr y Coed. The area above, Coed Tycanol, is a steeply sloping oak woodland. At the top of the slope the third area, known as Carnedd Meibion Owen, is a heathland dominated by six large rock outcrops. It is these rocky outcrops that give it its name: Carnedd, or cairns. Over the past five to ten years the heathland had become overgrown by bracken and gorse. For years Welsh Mountain ponies had grazed the area, but their number was not sufficient to stop the spread of the gorse and bracken, and the grassy heathland on Carnedd Meibion Owen had become a very serious fire hazard during dry weather. This threatened both lichen and bryophyte communities on the heathland and epiphytic plants on the southern boundary of Tycanol Wood. Boulders were hidden amongst the bracken, so it was impossible to use a mechanical means of management. The only option was to spray the whole site with a herbicide, Azulox, which only targets bracken and fern species,

and would not damage any of the saxicolous lichens living on the rock outcrops or on the boulders. The chemical was applied by hand using knapsack sprayers and with an ULVA (Ultra Low Volume Applicator) sprayer. The ULVA uses neat chemical, which is sprayed over the bracken, and which depends a lot on the wind to help drift the chemical over the area to be covered. Using the ULVA allows a better intake by the bracken of neat chemical, thus helping to speed up the process of kill off.

An increase in the number of ponies grazing the site has also helped to keep the bracken in check: by simply walking through the bracken, damaging the stems, they are weakening the plants. In the last two years there has been a noticeable difference in bracken coverage. The extensive stands of gorse were shading the lichens on the rocks. Again due to the hidden boulders in and under the gorse, it was impossible to attack the stands with large-scale machinery or vehicles. It was also not possible to use any form of herbicide, as it would need a non-specific kind to treat it and this would be detrimental to all species in and around the area. The only possible way of doing it was by hand: this would be a long slow process.

We started by clearing around the base of each rock outcrop to see how effective large-scale work would be, as all the work done prior to this had been done by hand, clearing small patches that had grown on the outcrops themselves. A local contracting company was employed to cut the gorse as low as possible to the ground using brush cutters. The cut material was left on the ground, to be collected by me. The work was carried out in early spring but I didn't get round to collecting the cut material until the late summer. This was not a good move. Leaving the dead cut material on the ground stopped the new growth from being browsed by the ponies, and the dead material proved very hard to collect. Cut gorse remains very bulky even after being left for six months; the material I collected soon piled up into a great heap in a corner of the site that had very little biological interest. The next section to be cleared was twice the size of the first area, so this time the material was cut, taken to the corner of the site and chipped. The work was carried out during the winter; this was probably a mistake on our part. Due to the exposed nature of Carnedd Meibion Owen the site can be very cold even on a sunny winter's day. The contractors had to work through very cold days, with snow, heavy rain and hard frosts, if they could get on site at all. This ended up making the job much harder and last twice as long. After a long two and a half months the area was finally cleared. To finish off the work the contractors brought in a small tractor with a rear-mounted flail. As they could now see the boulders, they were able to avoid damaging them and their machinery. The area was then flailed, which took off any leftover stumps.

Although the work took longer than expected, both CCW and the contractors were very pleased with the results. During this summer the ponies have been able to get in and eat the new growth. Although the routes in and out of the site were a terrible mess, they have recovered well and in some places the ground disturbance has brought dormant heather seed to the surface and encouraged new growth. The new bare areas have also allowed some heather regeneration.

On the whole the site now looks much better, and a recent health check on the lichens in the area has shown that no damage has been done to any of the species. Exposing more of the boulders hidden in the past can only help to increase the area for lichens to colonise.

Iestyn Evans works for CCW as Reserve Manager at Tycanol National Nature Reserve.

Natur ar Warchodfeydd

Nid gwaith hawdd oedd clirio'r tyfiant trwchus o eithin a rhedyn ar rostir Carnedd Meibion Owen – ardal sy'n rhan o Warchodfa Natur Genedlaethol Tycanol yng ngogledd Sir Benfro. Roedd angen clirio er mwyn gwarchod cen arbennig y safle rhag tanau damweiniol a chreu mwy o arwynebedd creigiog agored ar eu cyfer. Bu rhaid dewis dulliau rheolaeth yn ofalus; defnyddiwyd y chwynladdwr Asulox er mwyn sicrhau mai dim ond rhedyn fyddai'n cael ei ddifa, a thorrwyd yr eithin â llaw o gwmpas y clogfeini cyn mynd ati i dorri gyda thractor a phori gyda merlod. Dysgwyd sawl gwers ddefnyddiol ynglŷn â'r math yma o waith rheolaeth ac mae'r canlyniadau yn foddhaol iawn.

Danger from the skies

Photo: Jim Clark.

The insidious nature of many pollutants, invisible to the naked eye, makes tracking them and understanding their environmental effects all the more important. The scale of nitrogen pollution is truly shocking, equivalent to several bags of nitrogen fertilizer being spread over each hectare of our most sensitive upland habitats each year. As ***Simon Bareham*** *and* ***Bridget Emmett*** *report, the search is on to address the effects of aerial nitrogen pollution on wildlife habitats.*

The equivalent of 2,000 cow pats fall onto every hectare of land.

What could be more invigorating on a fine, late summer's day than to head for the hills and breathe in the natural beauty that is all around you? Leaving behind the concrete and tarmac of the town, you travel up a small country road that peters out, then climb up an unmarked track. The plaintive cry of a raven drowns out the last rumblings of traffic from the now distant A470.

Pausing to catch your breath, you scan the far distant horizon as a primeval feeling of escape and 'oneness with nature' sweeps over you. Here above the last few sheep, lime green pastures and regimented blocks of conifers, you are standing knee deep in a blanket of shimmering purple-flowered heather. You might think that you have finally stepped out of the shadow that man has so indelibly cast on the landscape below.

How wrong you would be. Even these most remote and apparently pristine environments are under daily attack from an invisible and poorly understood enemy. While we have escaped the noise and bustle from human activities far below, pollution from there will follow us, carried on the winds, to be deposited in these remote and beautiful areas.

Because air quality has substantially improved across the UK, and no one seems to mention acid rain these days, people tend to think that air pollution problems have been resolved. You only have to go to a large city such as Manchester, where soot-blackened sandstone buildings stand alongside newly sandblasted ones, to be reminded of how bad air quality was at one time in parts of Britain. Less than 30 years ago, the masses of noxious pollution spewing from the UK power stations led to sulphur dioxide being dubbed, with irony, Britain's most successful export. This was part of the phenomenon of acid rain and earned the UK the unenviable title of "the dirty man of Europe".

Air quality across Wales and much of Europe has improved beyond recognition. However, with the high levels of rainfall we experience in Wales a significant amount of pollution is still being carried into our sensitive and remote habitats, but now in the form of nitrogen. Even high up on the side of a Welsh mountain there is evidence of the damage this is causing if we look closely. How do we know this? In the last four years two major vegetation surveys at a UK level have highlighted an alarming change in the diversity and composition of UK flora. The Countryside Survey, last repeated in 2000, and *The New Atlas of the British and Irish Flora*, which brought together the findings of over 1,600 volunteers and was published last year, both confirm an increase in plants which benefit from the high levels of nitrogen that rain down on our landscape throughout the year. Conversely some sensitive species, which thrive where nitrogen levels are low, have shown declines. This can be due to direct toxic effects or an increase in attack by disease and pests. Or they are simply not able to cope with the competition from aggressive and invasive nitrogen-tolerant species such as some grasses. Sensitive herbs, heathers, mosses and lichens are all under threat.

This polluting nitrogen comes from two main sources. One is the burning of fossil fuels in our cars and power stations, which releases nitrogen oxides into the atmosphere. The second is the agriculture sector; the intensive use of fertilisers causes nitrogen oxide emissions from the soil, and the intensive rearing of animals releases ammonia. The contribution of these different sources varies around the country and even from field to field, due to the different ways nitrogen oxide and ammonia are produced and dispersed in the atmosphere. Together, both sources have contributed to a huge increase in the amount of nitrogen affecting our habitats, to between 10 and 30 times the background levels at the turn of the twentieth century.

We know this by looking at the nitrogen content of archived plant samples, long-term soil records and by comparing our air quality with those of countries without our level of intensive agriculture and transport (such as northern Scandinavia). These studies suggest nitrogen inputs have increased from about 1 – 3kg per hectare per year in the early part of the 20th century to a mean for Wales of 20kg per hectare per year, with some areas recording as much as 40 or even 60 kg per hectare per year. Putting this into perspective, this is equivalent to an average of 2,000 cow pats falling onto a typical hectare of Welsh land every year in terms of nitrogen (one cow pat contains on average 9g of nitrogen). And remember, these nitrogen inputs come all year round and not just to agricultural land where the nitrogen may be positive in terms of nourishing crops. This nitrogen falls on our native woodlands, bogs, heathlands and mountain tops where these fertilizing additions are not needed or wanted.

Towards Beddgelert. Photo: Jim Clark.

The effects of nitrogen pollution can be seen most dramatically downwind of an intensive chicken or pig farm, where mosses, bluebells and wood sorrel are lost and displaced with tall rank grasses. The effects are not as dramatic away from these point sources of nitrogen pollution, but subtle changes are now being picked up in long-term records and large UK surveys. Recent work also suggests that nitrogen is increasingly being leached from the soil into streams and rivers even in semi-natural areas and this is having a negative impact on water plants, mirroring the effects seen on the land. Powerful EU legislation such as the Habitats Directive has challenged environmental regulators and advisory bodies such as the Environment Agency and CCW to fundamentally review how we assess and regulate air pollution. Through a consortium arrangement, a number of bodies working in partnership with the Centre for Ecology and Hydrology have developed a publicly available 'one stop shop' to provide a synthesis of information about air pollution and its effects on habitats. Details of the Air Pollution Information System can be found at http://www.apis.ac.uk. The most recent Government report[1] to comprehensively review the impacts of air pollution found that there was no systematic assessment of air pollution

impacts on the vegetation and health of habitats in the UK. The report went on to warn that this issue must be addressed as a priority if the UK Government is to comply with its reporting requirements stipulated by the Habitats Directive.

Across Wales and the rest of the UK there are a number of sites where air pollution and soil and water chemistry are measured. CCW and its sister bodies are also involved in various vegetation monitoring surveys, but so far we have not put the two programmes together to evaluate the condition of habitats in relation to air pollution. This is about to change, as the UK conservation agencies are working closely with The Department for Environment, Food and Rural Affairs (DEFRA), the Welsh Assembly Government, the Environment Agency, the Centre for Ecology and Hydrology and leading research scientists in a project to consider the best way to account for and address air pollution effects on our terrestrial habitats. This study is due to report early in 2005.

Tackling the air pollution itself will present a very serious challenge, as much of the nitrogen pollution affecting sites comes from diffuse agricultural sources that are currently not regulated. Ground-level ozone pollution is rising across the UK and will continue to do so into the foreseeable future. Ozone is an invisible toxic gas formed by the chemical reaction of sunlight on a cocktail of atmospheric gases, particularly man-made emissions, including nitrogen dioxide. Ground level concentrations of ozone become particularly high during episodes of sunny dry weather. During the summer heat wave of 2003 over 2,000 premature deaths were recorded across the UK, with almost a third attributed to ozone pollution. Levels regularly exceed the thresholds set to protect man and the environment. If ozone is having this dramatic impact on human health then there is great concern about what it is doing to vulnerable habitats that are bathed in this poison. Most people think of ozone in relation to the well-reported depletion (or hole) of the ozone layer in the stratosphere. While chemically we are talking about the same ozone gas, up there it provides a vital shield against damaging ultra-violet radiation, but down here it poses a significant threat. In that sense it is a bit of a Dr Jekyll and Mr Hyde substance. To tackle ozone effectively, global agreements will be required. (The issue of ozone pollution and the threats it poses to Welsh habitats will be the subject of an article in a future edition of *Natur Cymru*).

As we better understand how atmospheric pollution affects wildlife, and how this threat is altering, we cannot forget about the whole issue of climate change. This will act along with the deposition of nitrogen from air pollution, to present additional stresses on already threatened habitats. These are just some of the challenges we have to consider and face together if we are to protect some of our most valuable habitats into the future from the effects of air pollution.

Simon Bareham is Senior Pollution and Climate Change Adviser to the Countryside Council for Wales. **Bridget Emmett** is an ecosystem scientist who has specialised in the effects of nitrogen deposition for the last 10 years. She is Head of Site at the Centre of Ecology and Hydrology in Bangor.

References:

1 National Expert Group on Transboundary Air Pollution, NEGTAP can be found at http://www.nbu.ac.uk/negtap

Perygl y llygredd llechwraidd

Er bod awyr Prydain ac Ewrop dipyn yn lanach nag y bu yn y gorffennol, mae llygredd, ar ffurf nitrogen ac osôn, yn dal i fygwth ein llystyfiant a'n cynefinoedd. Crëir y llygredd nitrogen, yn bennaf, drwy losgi tanwydd ffosil mewn ceir a phwerdai, a thrwy ddefnyddio gwrteithiau a magu da byw yn arddwys. Mae'r llygredd nitrogen yn gallu niweidio planhigion yn uniongyrchol, eu gwneud yn fwy tebygol o ddioddef haint, neu yn annog tyfiant trechol gan rywogaethau cryfach. Mae'n anodd taclo'r llygredd am fod llawer o'r nitrogen yn tarddu o ffynonellau gwasgaredig sydd heb fod yn cael eu rheoleiddio. Mae'r osôn, sy'n ein gwarchod rhag ymbelydredd uwchfioled yn uchel yn y stratosffer, yn wenwynig pan fo'n isel ar y ddaear; mae arwyddion bod yr osôn isel yma ar gynnydd ac yn achosi marwolaethau cynnar ymysg pobl, yn enwedig mewn tywydd sych. Mae angen deddfwriaeth gref, cytundebau byd eang a gwybodaeth gadarn am effeithiau llygredd ar ein cynefinoedd er mwyn datrys problemau. Mae nifer o gyrff wedi dod ynghyd i greu ffynhonnell o wybodaeth gryno i'r cyhoedd ynglŷn â llygredd awyr – gweler http://www.apis.co.uk

Porpoise watching – *secrets of the north Anglesey coast*

Harbour porpoise mother and calf. Photo: Richard Shucksmith.

A stretch of wild and beautiful coast, with panoramic sea views, offers the chance of seeing dolphins and porpoises, and helping to uncover the secret life of these amazing mammals. ***Emily Fleur Dicks*** *and* ***Nia Hâf Jones*** *reveal all.*

The Welsh coastline is a perfect vantage point for watching cetaceans (porpoises, dolphins and whales), with its rocky headlands, sweeping bays and remote offshore islands. Many people are unaware of the range of cetacean species that inhabit Welsh coastal waters.

The two most common species are the harbour porpoise and its boisterous cousin the bottlenose dolphin. However, regular visitors are the Risso's dolphin, common dolphin and also the more elusive Minke whale. Many more cetacean species find their way onto Welsh beaches through misadventure. Strandings of dead animals have been in the news this autumn, with a 60ft fin whale washed ashore in south Wales within days of a very rare Sowerby's beaked whale.

To encounter these wild animals in their natural environment is such a privilege. These large charismatic mammals have captured the human imagination for centuries. Spending time scanning the open sea can be therapeutic in itself, but coupled with a wild encounter with an intelligent and playful marine mammal, the experience can be exhilarating and brings lasting smiles.

Anglesey waters – life on the edge

Anglesey is blessed with a wild and unspoilt coastal path. It is possible to walk for hours through a patchwork of wild flowers and grasses without encountering another human being, enjoying acrobatic displays of choughs, bickering oystercatchers, diving terns and gannets and the

broken sea reflecting inky skies and sparkling sunshine. It is difficult not to wax lyrical about such an idyllic scene as a porpoise mother and calf surface in synchrony, the calf only appearing every second time its mother breaks the water, exchanging the air in her lungs in an explosive and fleeting gasp.

Anglesey experiences some of the strongest tidal currents in the UK, which hug the shoreline closely at rocky promontories and headlands such as Point Lynas and North and South Stack. The northern coast is characterised by offshore rocks and islands, broken and uneven seabed pinnacles and gullies with rapid changes in bottom relief, resulting in lumpy seas even in calm weather.

Children enjoy being involved. Photo: Alison Palmer-Edwards.

Harbour porpoises are well known for their affinity with tidal races and are often found frantically feeding at running tides. They are the smallest and by far the most common cetacean to be found in Welsh waters. Females are generally larger than males, with an average length of 160cm and weighing 60kg, while the males average 145cm and 50kg. Newborn calves are tiny, about the size of a large salmon and typically 70-80cm in length.

Heat loss is an important consideration in a cold water habitat, and adults have a relatively thin blubber layer and a large surface area to body volume ratio. Smaller animals have a greater relative surface area than large animals, and therefore gain or lose heat more rapidly than larger ones. To balance such a demanding energy budget, porpoises spend a large part of their time feeding, but build up few energy reserves.

They are relatively short lived animals, reaching sexual maturity at three to four years old and with an average life span of nine years. Females gestate for approximately 11 months and may give birth annually to a single calf during their short reproductive life. This low reproductive rate makes the harbour porpoise especially vulnerable to extinction. The male's reproductive glands (testes) are large, nearly 2% of body weight, indicative of an energetic mating strategy.

Watching from the shore

Marine Awareness North Wales (MANW) is a voluntary community group based in Bangor, dedicated to raising awareness and promoting marine conservation issues throughout the local and national community. It places particular emphasis on educating young people, in the belief they will grow up with love and respect for one of nature's most magnificent and rewarding environments.

In 2000 MANW realised that the coastline of north Anglesey provided perfect vantage points to observe harbour porpoises and by 2001 a three-year land-based survey was well under way. The monthly survey days became popular events for many people keen to learn about cetaceans in their local waters. Over the three years nearly 100 volunteers took part. The main aim was to find out which stretches of water were best for harbour porpoises, to estimate a year-round minimum number in the area and also to identify any patterns of seasonal variation. During the summer months the land-based study was complimented by a boat based study.

Point Lynas has proved to be important for feeding whilst more conclusive data is needed to understand habitat use in North Stack and Holyhead Bay. A high incidence of mother-calf pairs around Middle Mouse suggests that this is an important breeding and nursing area.

The support of local birdwatchers and sea watchers has been imperative in creating a sightings database for harbour porpoise in Anglesey waters. MANW would like to highlight the hard work and dedication of local birder, Dave Powell, who has worked tirelessly to provide over 700 hours of sighting records from Point Lynas.

Here is the number of sightings made by Dave Powell from Point Lynas. The number of actual animals will be lower.

	Harbour porpoise	Bottlenose dolphin	Risso's dolphin	Common dolphin	Minke whale
2002	1,153	113			
2003	2,078	183	40		1
2004 (to Oct)	1,704	32		7	

Although final analysis of the data is yet to be completed, it looks likely that north Anglesey waters are important for harbour porpoises in terms of numbers and habitat use. For example, we know that there is a year-round population, with numbers increasing during the summer months.

Getting out on a boat

The aim of the boat-based survey was to incorporate a more scientific approach to achieve goals specified in the action plan, and was established principally to answer the question 'How many porpoises are present in north Anglesey during the summer months?' It would also allow MANW to survey areas which could not be surveyed exclusively from land.

Mother and calf pairs are often seen around Middle Mouse. Photo: Rohan Holt.

By the end of the three-year survey over 50 dedicated volunteers had surveyed more than 1,047 kilometres of transect line, detecting a total of 347 individual porpoises. The data collected not only allowed the production of an abundance estimate but also the identification of the relative importance of certain areas within the study area as a whole. Using complex statistics to analyse the sightings data, it is estimated that there are 618 individuals around north Anglesey during the summer months. Due to the fact that this figure is only an estimate it is also calculated that the true number of individuals may indeed be anything between 432 and 883 animals.

Over 60% of the sightings were recorded within five kilometres of the shoreline, reinforcing the theory that Anglesey's inshore waters are extremely important for this species. It is thought that whilst strong currents surrounding the headlands provide excellent feeding grounds, the shallow, sheltered bays provide areas in which porpoises can calve and nurse their young. It is unfortunate that recreational use of these areas, bringing increased disturbance, may be at its peak during critical times of the year for the porpoises.

The importance of some areas over others in terms of numbers was also observed across the study area. The waters surrounding South Stack claimed the highest number of animals with Point Lynas waters a close second. Although it is thought that waters surrounding Point Lynas provide an excellent feeding ground, it is not yet known why South Stack seems to be so popular.

The boat-based survey has allowed MANW to take a robust scientific approach. Complimented by land-based sightings, the results will be invaluable in understanding the ecology of harbour porpoises in north Anglesey waters.

A little bit of help

MANW has received money from the Species Challenge Fund for the boat based survey. It is important to stress how valuable this funding has been in the delivery of Local Biodiversity Action Plans and work towards halting biodiversity loss by 2010.

Photo: Richard Shucksmith.

As the north Anglesey coast has been designated as an Area of Outstanding Natural Beauty, Anglesey County Council are lucky enough to be able to fund environmental projects through yet another pot of money, the Sustainable Development Fund. Land-based surveys were grant-aided via this mechanism, enabling members of the local community to glimpse wild porpoises and enjoy walking the coastal path.

Spreading the word

One of the fundamental problems facing the marine environment today, particularly in the UK, comes from a lack of concern due to lack of knowledge. The problem is made worse by the general belief that British seas are cold, dark and lifeless. Because of this, education of both children and adults is a priority for MANW, to inspire and enthuse future generations about the value of their marine natural heritage. On Bangor pier two kiosks serve as Education and Awareness Centres, providing a venue for the public to experience marine wildlife first hand. MANW considers it a priority to bring the results of projects like the harbour porpoise action plan to the people that helped make it work.

What next?

There is endless scope for further MANW projects, both scientific research and educational work. The development of the Education and Awareness Centres into an informative and interactive focal point is well underway. The future also promises a fully functional mobile education resource, enabling anyone to learn about the amazing marine life we have around us in Wales.

Scientific research will now focus on the analysis of data that has been collected so far. The results will provide extensive information about harbour porpoises in north Anglesey waters and will feed essential information into local and national Harbour Porpoise Biodiversity Action Plans. Further research into the ecological significance of north Anglesey is also a priority, and work towards this is now in its initial stages.

Emily Fleur Dicks is one of the founder members of MANW and is currently the Awareness Officer for the Wales Biodiversity Partnership. **Nia Hâf Jones** is the Education Outreach Officer for MANW.

Anglesey waters in a tranquil moment. Photo: George Stoyle.

Get involved

Harbour porpoises can be spotted from almost any headland around Wales if you sit there for long enough. Porpoise 'hotspots' include Point Lynas on Anglesey, Bardsey Sound in Gwynedd and Strumble Head in Pembrokeshire. The best way to safeguard marine biodiversity for future generations is to enthuse and inspire the children of today. If you are involved with a school or youth group in north Wales please contact Nia Hâf Jones about a visit or attending a workshop at the Centre for Marine Awareness on Bangor pier (nia@saveourseas.co.uk, 01248 351560). Visit MANW's website for further information: www.saveourseas.co.uk

Strandings

Please report dead cetaceans to Marine Environmental Monitoring on 01348 875000. If possible they will undergo a post mortem to establish cause of death and monitor population mortality. Live stranded cetaceans should be reported to the RSPCA on 08705 555999.

To find out more about Biodiversity Action Plans visit www.biodiversitywales.org.uk / www.bioamrywiaethcymru.org.uk or phone the Ecologist or Biodiversity Officer at your local Council.

Useful addresses

Marine Awareness North Wales
31 Upper Garth Road, Bangor,
Gwynedd, LL57 2SR www.saveourseas.co.uk
Email: info@saveourseas.co.uk

Friends of Cardigan Bay
Cwm Meurig, Cymsymlog, Aberystwyth, SY23 3EZ
www.fraw.org.uk Email: Jennyfell@mid-wales.net

Cardigan Bay Marine Wildlife Centre
New Quay, Ceredigion, SA45 9PS
Tel: 01545 560032 or look under Marine Wildlife Centre in www.seawatchfoundation.org.uk

Sea Trust South & West Wales
www.seatrust.org.uk Email: info@seatrust.org.uk
Tel: 01348 875639

Gower Marine Mammal Group
www.gmmp.org.uk Email: web@gmmp.org.uk

Practising a rescue with models. *Photo: Rohan Holt.*

Cyfrinachau arfordir Môn

Mae arfordir amrywiol Môn yn cynnig cynefinoedd addas i greaduriaid morfilaidd ac mae llwybr yr arfordir yn cynnig llecynnau da i'w gwylio. Yn 2001 sefydlwyd arolwg 3 blynedd o greaduriaid morfilaidd Sir Fôn gan grŵp Marine Awareness North Wales (MANW) – grŵp gwirfoddol sy'n hybu ymwybyddiaeth o bynciau cadwraeth môr, yn enwedig ymhlith pobl ifanc. Pwrpas yr arolwg oedd amcangyfrif niferoedd llamhidyddion a darganfod pa rannau o'r môr oedd bwysicaf ar eu cyfer. Bu rhyw 150 o wirfoddolwyr wrthi'n cofnodi – o'r tir ac o'r môr.

Ymhlith yr ardaloedd pwysicaf ar gyfer y llamhidyddion mae Trwyn Eilian, Ynys Arw a Bae Caergybi ac Ynys Badrig. Roedd llamidyddion yn bresennol drwy'r flwyddyn a'u niferoedd yn uwch (rhwng 432 a 883 unigolyn) yn yr haf. Cadarnhawyd bod y dyfroedd sy'n agos at y glannau yn hynod o bwysig. Credir bod y cerhyntau cryf o gwmpas y pentiroedd yn creu ardaloedd bwydo da a bod y baeau yn fwy addas ar gyfer bwrw lloi. Y rhain hefyd, yn anffodus, yw'r ardaloedd mwyaf poblogaidd ar gyfer gweithgaredd hamdden.

Green **Bookshelf**
Silff Lyfrau *Amgylcheddol*

The End of the Line
Charles Clover
Ebury Press 2004, £14.99 hardback
ISBN: 0-09-189780-7

Freshwater Fishes in Britain – the species and their distribution
Davies, Shelley, Harding, McLean, Gardiner and **Peirson** (Eds)
Harley Books 2004, £25 hardback
ISBN: 0 946589 76 3

Europe, **Charles Clover** writes, is backing towards a cliff in a fog. The context, of course, is its inane fisheries policy, which beats its farming companion into a cocked hat for ecological insensitivity. A spy on the wall at a recent fisheries meeting in Brussels told me this tale. A representative from an international conservation organisation showed a film which presented clear evidence of a connection between Brussels-funded purse-seine netting of everything that swam off a stretch of the west African coast, and the fate of our closest living relatives, chimpanzees. Local people, deprived of their traditional source of protein from the sea, were turning to bush meat as a replacement. At the end of the film, the Chair of the meeting ruled that the issue had nothing to do with fisheries policy.

There is much to make you justifiably angry in Clover's searing account of the mismanagement of the greatest food source which nature has bestowed on us. But there is much more to Clover's story than this. It is a parable about the fate that awaits us if we misuse the Earth, and a lesson in good and bad governance. Iceland, whose very culture is based on harvesting the sea's bounty, cannot afford to ignore the limits to sustainable fishing. Its government has heeded scientific opinion, and, as a result, its fishermen are now reaping the rewards, in the form of growing cod stocks.

Whether standing on the dock of the whale fjord at Hvalfjord, flecks of the first snow of autumn drifting out of a leaden sky, or watching the fish auction at the Tsukiji market in Tokyo, where wholesalers scramble to buy the best fish, Clover takes you inside the cold, wet, smelly world that feeds the insatiable human appetite for fish. He makes the link between this industry and our own lives, pointing out that wild fish conservation is a human health issue. As consumers of all this fish, he does not let us off the hook. There is even a chapter on which fish to choose.

The waters Clover charts may be murky, a sediment-heavy shadow of death replacing once abundant marine life, but he has crafted a fine vessel to take us there. Not only is the writing pleasing; he grasps any straw that promises a wind of change. He visits New Zealand's Goat Island Marine Reserve, and hears how people are beginning to question why all the seas are being fished, and learns that the case for marine reserves and no-take zones is gaining momentum. There are reasons to be cheerful, however long the haul may be; this book is one of them.

There are plenty of books about fish, but few are written from a naturalist's perspective – what fish naturally occur where, and what is happening to them. ***Freshwater Fishes in Britain*** does an excellent job for our fish as natural inhabitants of lakes, rivers and streams. The information it gathers together can only assist the conservation of important Welsh species like arctic char, gwyniad and the two shads. I also found unexpected delights in these pages. The introduction includes a discussion of the history of fishes in food, and fishes in art, for example. Much of the information in this informative and well-illustrated work is also available on the web, through the National Biodiversity Network (NBN) gateway www.nbn.org.uk

James Robertson

A Bird in the Bush – A Social History of Birdwatching
Stephen Moss
Aurum Press 2004, Hardback £16.99
ISBN: 1-85410-993-6

Receiving this book, I dipped into a chapter at random before starting at page one. My heart sank. Much of the ground seemed to have been well covered by Mark Cocker in his recent book *Birders – Tales of a Tribe*.
Oh no – not another book about the good old days of birding, the grapevine, bread pudding at Nancy's, jumpers for goalposts…

I needn't have worried. ***A Bird in the Bush*** is far more than that. It is, above all, a book about names. Names such as Upcher, Hume, Tristram, Allen and Blyth. Are they unfamiliar? Then try Cory, Montagu, Bewick, Wilson and Audubon. All have one or more birds named after them (for the record they are two warblers, a starling, gallinule, pipit, shearwater, harrier and swan, whilst Wilson and Audubon have half a dozen species between them). Names that have been familiar for years, and many that haven't, come alive as Moss traces the origins of birding, from *The Natural History of Selborne* to *Birds of the Western Palearctic*. It's not all flattering. Cory was arrogant and boorish, whilst Audubon's enthusiasm for naming birds after his mates led to him 'naming' the various plumages of Hairy Woodpecker no less than five times. Moss is at his most interesting when birding is almost an afterthought set

against the great events of the time. The descriptions of birds in the horror of the Western Front, where they appear in the writings of poets like Siegfried Sassoon, are particularly poignant. The chapter on the interwar years is similarly fascinating, whilst the following one on World War II concentrates on the exploits of birders in POW camps. He even manages to work in 'The Great Escape' – try listening for the birding reference this Christmas!

The book loses its way a little towards the end. There is the discussion of the 70s and 80s, without which it would not be complete, that draws heavily on Mark Cocker's work. In truth, it doesn't dominate the book, but does recycle some well-worn stories, and repeats the tired conceit about birding becoming 'a competitive sport'. But you get the impression of a small clique of East Anglian and South East birders talking about themselves to themselves. Are there no characters or tales to tell in the Welsh or Scottish birding scene? And I sincerely hope that Moss got several free trips from the Ornitholodays or Limosa wildlife tour companies. They get the kind of product placement that Coca Cola pays millions for.

Moss also includes an intriguing chapter on why there are so few really keen female twitchers. The discussion is a bit inconclusive, but he comes down on the side of the argument, which proposes that most men prefer pastimes that can measure success, whilst women generally prefer social, cooperative activities, hence male dominance in the world of twitching. But what he doesn't do is actually ask any women! When I tried this on a small sample of female CCW staff (all with a strong natural history interest) the answer was pretty plain – they enjoy seeing new birds, but are turned off by the competitiveness and the desire to take things to extremes that twitching involves. As one put it, "Would twitchers twitch if they couldn't tell anyone about it afterwards?" This seems to bear out Moss's conclusion.

A Bird in the Bush is a well researched and well written book, and I expect a paperback version will not be long coming. It can be recommended to all birdwatchers and to those who enjoy learning something of the 'history' in natural history. For myself, I'm sure I will find myself returning, at least to some of the chapters, again and again.

Andrew Lucas

Cacwn yn y Ffa – Casgliad o Ysgrifau Wil Jones y Naturiaethwr

Duncan Brown a **Siân Shakespear** (Golygyddion)
Llyfrau Llafar Gwlad, Gwasg Carreg Gwalch 2004, £5.00
ISBN: 0-86381-927-3

Dyma gasgliad difyr o ysgrifau a detholiad o ddyddiaduron Wil Jones, Croesor, y naturiaethwr. Ceir yma ddisgrifiadau byw a lliwgar o fyd natur a bywyd cefn gwlad trwy olwg y naturiaethwr hynaws, a fu'n gweithio am ran helaeth o'i fywyd fel warden ar warchodfeydd natur Gogledd Cymru. Mae ei ddisgrifiadau yn gyfoethog a lliwgar. Darllenwch, er enghraifft, yr erthyglau am adar – fel yr un lle mae'n llwyddo creu darlun perffaith o fronwen y dŵr gyda'i ddisgrifiad clir o'i hymddygiad a'i golwg. Mae'r disgrifiad o'r bwncath yr un mor fanwl a chywir. O ddarllen disgrifiadau Wil nid oes angen llawlyfr adarydda arnoch i adnabod yr adar mae Wil yn eu disgrifio.

Cewch hanes newidiadau mewn arferion ffermio ac am blannu coedydd pîn, ac effeithiau hyn wedyn ar fywyd gwyllt cynhenid yr ardal. Nid yw Wil yn beirniadu tirfeddianwyr nac unigolion, ond yn hytrach yn rhoi disgrifiadau manwl o'r newidiadau dros y blynyddoedd, gan esbonio pam y mae dirywiad wedi digwydd yn niferoedd rhywogaethau. Mae Wil yn dangos yma yr angen i gael cydweithrediad trigolion lleol i annog ffyniant bywyd gwyllt.

Gwelir yn ei adroddiadau am ei deithiau natur fod ganddo gyfoeth o wybodaeth am gefn gwlad a'i harferion, ac mae'n cyffwrdd â phob math o agweddau, o ddaeareg i ddefnydd tir. Mae'n disgrifio effeithiau defnydd tir mwy diweddar fel y chwareli ac amaethu ar fywyd gwyllt heddiw. Yn ei erthyglau mae'n amlwg yn edmygu gwaith crefftwyr ac adeiladwyr waliau cerrig sych – fel y rheiny fu wrthi, er enghraifft, yn codi wal gynnal rheilffordd Ffestiniog.

Efallai mai'r erthyglau mwyaf difyr yw'r rhai am y cynefin ble treuliodd Wil y rhan fwyaf o'i yrfa fel warden, sef yng nghoedwigoedd Dyffryn Maentwrog. Darllenwch am effaith rhai lindys ar y coed derw, a'r cyfoeth bywyd gwyllt sy'n dibynnu ar y dderwen, mewn cymhariaeth â choedydd pin. Yn yr erthygl hon mae Wil ar ei orau – ac yn bathu enw newydd ardderchog ar y lindys barus – 'y blingwr'! Mae' n disgrifio hefyd gwerth y dderwen yn y gorffennol – a'r defnydd a wnaed o bob rhan bron o'r goeden (o'r pren i'r rhisgl) ac yn nodi, mewn cymhariaeth, mai gwerth pennaf y goeden erbyn heddiw yw ei chyfraniad i'n hamgylchedd a'n bywyd gwyllt. Mae e'n gorffen yr erthygl yma gyda'r frawddeg "Nid ar chwarae bach y mae'r dderwen wedi goroesi holl anawsterau'r oesoedd o fod y goeden naturiol fwyaf niferus yn ein gwlad, ac felly'n bwysig iawn yn ein hamgylchfyd naturiol."

Wrth ddarllen ei erthyglau gallwch rannu'r pleser, a'r hwyl a gafodd Wil yn astudio byd natur. Darllenwch amdano yn twyllo'r troellwr mawr, ac yn rhwydo gwas y neidr – fel petai yn Wimbledon – ond hynny ar ganol siglen o dir mynyddig!

Fe gewch chi ddyfalu beth yw arwyddocâd y teitl ***Cacwn yn y ffa***. Mwynhewch y darllen.

Hywel Roberts

Nodiadau'r **Cynulliad** / **Assembly** *Notebook*

gan / by **Hâf Roberts**

Daeth chwa o wynt i gynhyrfu'r dyfroedd pan ddychwelodd yr Aelodau ar ôl yr haf. Roedd disgwyl y byddai deg aelod, o dan arweinyddiaeth Alun Cairns, yn mynnu fod y Cynulliad cyfan yn cael cyfle i drafod achos Scarweather, y fferm wynt oddi ar arfordir Porthcawl, yn hytrach na derbyn penderfyniad y Pwyllgor Cynllunio.

Roedd y Pwyllgor Cynllunio wedi pleidleisio dros adeiladu'r fferm wynt, yn groes i benderfyniad yr Archwiliwr, a mynnai'r deg ei fod yn fater rhy bwysig i'w adael i bedwar aelod, er eu bod yn grŵp traws-bleidiol wedi eu hyfforddi ar gyfer achosion tebyg.

Roedd yn achlysur prin yn y Cynulliad wrth i'r Aelodau baratoi at bleidlais rydd. Roedd rhyw gynnwrf yn y siambr a phob un yn ei sedd. Allai'r bleidlais fynd o blaid Alun? Roedd ansicrwydd amlwg ynglŷn â'r goblygiadau cyfreithiol petai penderfyniad y Pwyllgor Cynllunio yn cael ei wrthod, ond cipiwyd y ddadl gan safiad cryf rhai aelodau Llafur. Dadl dros y broses oedd hi mewn gwirionedd, yn hytrach na dadl am y fferm wynt ei hunan. Cadwodd Carwyn Jones lygad clòs ar ei etholwyr o Borthcawl a oedd yn rhythu ato o'r galeri cyhoeddus yn ystod y ddadl. Er yr holl ddamcaniaethu, y ddadl dros gefnogi'r broses enillodd. Ond cymerwyd cam pwysig tuag at gyrraedd targedau ynni adnewyddadwy i Gymru ar yr un pryd.

Cafodd y Cynllun Gweithredu ar gyfer Datblygiad Cynaliadwy dderbyniad ffafriol yr wythnos ganlynol er gwaetha' ymdrech y Toriaid i gynnwys hela a gwiwerod coch yn y gwelliannau. A'r newydd da yw y bydd y Cynllun yn sefyll fel atodiad ffurfiol i Gynllun Strategol y Llywodraeth. Ar ôl hir aros, cafwyd targedau a dyddiadau cyflawni penodol gyda phwyslais ar ynni adnewyddadwy, safonau adeiladau a chaffaeliad gwyrdd. Dylid croesawu'r ymrwymiadau ymarferol yn y Cynllun, megis cyflwyno cytundebau prydau ysgol newydd ar sail mwy cynaliadwy a chreu cynllun amaeth-amgylcheddol uchelgyrhaeddol. Ond heb ddulliau integreiddio polisi a dangosyddion i'n galluogi ni i weld y darlun cyfan, nid oes modd anelu at ddyfodol mwy cynaliadwy, faint bynnag o dargedau canmoladwy sydd yn y Cynllun.

Cyflwynodd Andrew Davies ei ddogfen 'Arbed Ynni Cymru' gyda datganiad cryf ei fod yn cymryd datblygiad cynaliadwy o ddifrif. Cafodd y gwrthbleidiau ddigonedd o amser i ddisodli'r cynllun fel dogfen di-asgwrn cefn arall heb fawr o sylwedd na chyfeiriad. Mae'n darllen fel pamffled gwybodaeth yn hytrach na strategaeth bwrpasol, ond mae'n cyfeirio at arfer gorau mewn amryw o sectorau a gallai felly fod yn fan cychwyn defnyddiol i brosiectau eraill tebyg, os gall y Cynulliad greu porth digon effeithiol ar y we. Gyda'r ymrwymiad i ddatblygu amrywiaeth o dechnolegau ynni adnewyddadwy yn rhan ganolog o bolisïau a rhaglenni'r Cynulliad, dan y Cynllun Gweithredu, dylem sicrhau fod y Llywodraeth yn cadw at ei haddewid.

Mae **Hâf Roberts** yn Swyddog Polisi, WWF Cymru.

The winds of change swept through the Assembly on its return from summer recess, giving members a rare opportunity to vote freely. Ten AMs, led by Alun Cairns, put in a motion effectively to get the Assembly to debate the Scarweather Sands case in Plenary, rather than accept the Planning Committee's decision. The Committee had controversially overturned the Planning Inspector's recommendation and decided to give the go ahead to the proposal to build the wind farm off the coast of Porthcawl.

It was a full chamber when the motion was debated, adding to the excitement and general feeling that voting could go either way. There was uncertainty over the legal implications of rejecting the Planning Committee's decision but the principle that due process had taken place won the day, supported by strong contributions from Labour. The Order would be made, giving Wales an opportunity to make a contribution towards achieving its renewable energy target.

The Assembly's long awaited Action Plan for Sustainable Development was generally welcomed as it now includes timed targets and stands as a formal addition to the Government's Strategic Plan. The amendments held a few red herrings (or squirrels) but there was support for the emphasis on renewable energy, building standards and procurement proposals. The commitments for new school meal contracts based on more sustainable principles and the proposal for a top tier agri-environment scheme, for example, should be welcomed as they provide practical solutions. But the absence of indicators and lack of clarity over the integration tool prevents us from seeing the big picture, and measuring in which direction all this is taking us.

Andrew Davies' Energy Efficiency Action Plan 'Energy Saving Wales' gave him the opportunity to declare how seriously he takes the sustainable development agenda. The opposition proceeded to scorn the latest glossy to emerge with no substance or direction: it was more of an information guide with useful case studies that could be a good starting point but with no financial commitments, costings or energy figures. With the commitment to develop a variety of renewable energy technologies firmly in the Action Plan, the Government should be held accountable to that promise.

Hâf Roberts is Policy Officer, WWF Cymru.

Biodiversity *news*

Julia Korn reports

Bioamrywiaeth Cymru
Biodiversity Wales

Biodiversity Award – a celebration of local action

Members of the Local BAP community in Wales came together in September to share ideas, celebrate success and voice concerns about issues affecting the rich and diverse biodiversity of Wales. The Welsh Assembly Minister Carwyn Jones (AM) opened the annual Local Biodiversity Action Group Seminar on September 14 and 15, and presented the first Wales Biodiversity Partnership Award. The joint winners for 2004 were the Ruperra Conservation Trust from Caerphilly and the Marloes Coast Project in Pembrokeshire. The Ruperra Conservation Trust are working to protect and enhance six local species and habitats, actively raising awareness locally and involving the community in decision-making and management of wildlife sites. In the last year they monitored dormouse boxes and surveyed a colony of greater horseshoe bats to determine flight lines from their maternity roost. The local community is consulted about how best to manage wildlife sites and the Trust organises guided walks and talks around Coed Craig Ruperra – a well-known local beauty spot – to raise awareness of local wildlife in Caerphilly.

The Marloes Coast project is working with landowners and managers to restore heathland, flower rich grassland, hedge-banks and ponds along a section of the Pembrokeshire coastal path. The project includes introducing 'wildlife-friendly' practices such as retaining winter stubble to benefit seed-feeding birds and utilising the sulphur bi-product from the local Chevron-Texaco refinery (see *Natur Cymru* No 12, pp18-22).

Spreading sulphur along the Marloes coast. *Photo: Matt Sutton.*

Photo: WBP

Bethan Cox, Marloes Coast Project and Eric Hawkeswood, Ruperra Conservation Trust, collecting the awards from Carwyn Jones AM.

All 14 nominated projects demonstrated significant benefits to biodiversity through partnership working, community involvement, value for money and raising awareness of their work. For more information on all nominations please visit the Wales Biodiversity Partnership website (below).

Local Biodiversity Action Partnerships in Wales

Nearly every Local Authority area in Wales now has a published Local Biodversity Action Plan and this has allowed the partnerships to shift their focus from paper to action. Local BAP Partnerships have been able to harness local energy and expertise to raise awareness of biodiversity and to undertake practical projects. These include producing local newsletters, organising public events and surveys, wildlife gardening projects, working with schools and colleges, providing training and habitat management. Local Partnerships are beginning to stimulate funding to address their priorities, for example through the excellent CCW Species Challenge Fund which has increased the capacity of the voluntary sector to work in partnership to further the conservation of BAP priority species.

Julia Korn is WBP's Local BAP Facilitator and can by reached on 01248 385 793 or email j.korn@ccw.gov.uk

For further information on what is happening in your area please visit the Wales Biodiversity Partnership website www.walesbiodiversity.org.uk or www.bioamrywiaethcymru.org.uk or contact Julia.

Marine *matters*

Ivor Rees discusses some of the rarer fish to be found in Welsh waters

Keeping track of sea fish

Last summer, the fate of a sturgeon inadvertently caught by a Swansea trawler developed into somewhat of a newsworthy pantomime. A fish merchant spirited it away from officialdom into the safety of a cold-store before passing it on for scientific study. The events illustrated the problems in applying nature conservation legislation to marine fish beyond putting them on schedules. So often, rare fish turn up as by-catch and even those caught by anglers are usually dead by the time it is realised what they are. Sturgeon are very large, of odd appearance and Royal Fish, so are unlikely to be overlooked.

A search of archives showed records of at least ten sturgeon in the Bristol Channel since the 17th century with a few more in the adjoining rivers. The recent Swansea one happened to get taken to Plymouth fish market, where it was photographed. A staff member of the National Marine Aquarium in Plymouth noticed that it belonged to the blunt-nosed species of sturgeon, not the more familiar one whose scientific name is listed in the conservation schedules. The two species are not easy to separate and some of the popular fish identification books do not mention the second species. If there are problems in keeping track of changes in populations of spectacularly large fish, how much more so for smaller species and especially so where a rare one differs only slightly from a common one.

In recent years there have been a number of additions to the fish fauna of Welsh seas. Many of these, such as the blue runner *(Caranx crysos)* caught by an angler off Mumbles pier in October 2000, have been warmer water species. Whether the frequency of such records indicates northward shifts in distribution or greater reporting of such unusual catches can be debated. Like birds, there have always been vagrant fish straying far from their normal range, such as the yellow-fin tuna that stranded on a sand bank near Port Meirion in 1972.

In Forrest's *Vertebrate Fauna of North Wales*, published in 1909, there are a number of records of fish that must have been vagrants. Question marks lie over others including some of the rays normally found in deeper water, where misidentification is a distinct possibility. Because of recognition difficulties, official statistics of commercial landings of rays do not separate the species. This makes it doubly difficult to estimate relative declines amongst a group of species particularly vulnerable to over-exploitation. In spite of this, it is clear that the largest species that used to be frequent off Welsh coasts, the inappropriately named common skate, is now virtually extinct in the Irish Sea. In Forrest's time skate that were over two metres across were caught fairly often. For today's anglers the commonest skate or ray is the thornback, so this is a case where loose parlance can lead to confusion. Use of common names also adds to the difficulty in tracking changes to another scarce and declining large cartilaginous fish. The species of angel ray *Squatina squatina* occurring in British seas shares the same common name of monkfish with the angler fish *Lophius piscatorius*.

This is not the place to deal with estimates of changing commercial fish populations. For the naturalist, possible changes in small and less common species are of equal interest. A clear example has been the triggerfish. When one was caught by a Conwy trawler off the Constable Bank in October 1964, the record was unusual enough to appear in the annual reports of rare fish published by the International Council for the Exploration of the Seas. Within the last 10 years divers have even been seeing shoals of small ones at favoured spots off south Wales. This and greater numbers of red mullet seem to be examples of northward shifts in warmer water species. It is hard to keep track of such changes. At first individuals get reported as unusual finds but, as they get more frequent, they cease to be reported so it becomes more difficult to assess how common they really are.

A comparison between the status of various fish given by authors such as Forrest a century ago and what we know about them now can be instructive. One does, however, have to bear in mind how Forrest would have arrived at his opinions of abundance. Many reports clearly came from a few correspondents who were sea anglers or to whom commercial fishermen brought their unusual catches. Thus the opinion that scaldfish were uncommon in the 1900s when they are now seen to be regular in small-mesh sampling trawls is probably a function of catching methods. That there are three species of dragonet was overlooked in Forrest's time, and SCUBA diving has allowed others such as the leopard-spotted goby to be found. With sea conditions likely to change further there is continuing interest in keeping track, not just of spectacular rarities or major commercial stocks, but of a wide range of others. The fish community should respond to warming more quickly than sessile invertebrates and at least equally to ecosystem shifts due to selective over-exploitation of some commercial species.

Ivor Rees is a marine biologist and formerly was senior lecturer in Ocean Sciences at the University of Wales, Bangor.

Nature *at large*

Frances Cattanach provides a round up of mammal news

Water shrews

The Mammal Society is currently running a Water Shrew Survey and is seeking volunteers who can carry out surveys during the next season from 1st July to 30th September 2005.

The water shrew is one of Britain's least known mammals, and there is a concern that it may be undergoing a decline in numbers. Larger than the common and pygmy shrew, it has dark fur on its back, with a silver-grey underside. It is semi-aquatic, feeding largely on freshwater invertebrates. The survey aims to provide a baseline against which to monitor future changes to their populations, to find out their habitat requirements, and to assess their conservation needs. One of the reasons we know so little about them (especially true in Wales) is that they are small, unobtrusive, and their field signs are extremely difficult to find in dense vegetation. The survey is easy to do, using plastic tubes baited with blow-fly larvae, and completing a simple form. Four tubes are placed in a suitable habitat (on river or stream banks or in wetland habitats), and then are left for two weeks. The tubes, hopefully containing water shrew scats (droppings) are then collected, the scats identified, or sent to the Mammal Society for identification. The society ask that four sites are done in this way. If you would like to help and increase our understanding of these fascinating mammals, please contact Dr Phoebe Carter on 020 7350 2200, or pcarter@mammal.org.uk.

Pied flycatcher by Philip Snow.

Weasel trouble

Geoff Gibbs reports that the sessile oakwoods at Coedydd Aber NNR in north Wales are home to many interesting birds, including the pied flycatcher. A hundred nest-boxes here normally provide homes for around 30 pairs, and are checked each year to record nesting success. In 2004, student helpers Nikki Brookshaw and Alistair Blackshaw were horrified to find that almost all the flycatcher nests were predated at the egg or small young stage. The culprit is a weasel (or weasels), which can climb trees with great ease and get in through the entrance hole. How do we know? One was seen in the act at Aber during the year, and similar problems have occurred with great tits at Wytham Woods, Oxfordshire. Duncan Brown from the Countryside Council for Wales says the small mammal population at Coedydd Aber was extremely low in 2004, with only three individuals (mice and voles) caught in 98 traps over three nights. This is the lowest catch since trapping started there in 1986, so maybe we had a very hungry weasel in 2004! Fingers crossed for more mice and voles in 2005, which should solve the problem.

Photo: CCW.

Hare today...

The North Wales Wildlife Trust is asking for records of hares. Results from a previous study in 1998 showed that they appeared to be widespread and mainly found around farmland where stock levels were not too high. However, the Trust noted that the population was in decline, due to a number of factors which included changes in farming practices (conversion of grassland to arable), intensification in cropping and harvesting, livestock intensification and hunting. If you have any records you wish to submit, please contact the North Wales Wildlife Trust for a record form on 01248 351541 or fcattanach@cix.co.uk.

Frances Cattanach is Director of the North Wales Wildlife Trust.

Hysbysfwrdd / NoticeBoard

If you would like your wildlife event to feature on this page please contact Mandy Marsh on 01248 385574 or e-mail m.marsh@ccw.gov.uk

Shared Earth Trust at
DENMARK FARM
17 Feb *Creating a Conservation Plan*
18 Feb *Practical Hedgelaying & Coppicing*
17 Mar *Wildlife of the Teifi Valley* Evening talk
01570 493358 or email:
set@denmark-farm.freeserve.co.uk
www.shared-earth-trust.org.uk

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PROFESSIONAL COURSES
Tel: 0871 871 4004
Fax: 01766 772609
Web www.plastanybwlch.com
Email: plas@eryri-npa.gov.uk
26-28 Jan *Today's Wardens Educating Tomorrow's Custodians:* Angharad Harris.
31 Jan-3 Feb *A Way with Words:* James Carter & Susan Cross.
14-17 Feb *Advanced Management Planning:* Andrew Weir.
21-23 Feb *Access for All – Managing and Delivering the Countryside for People with Disabilities (Course 2):* Andrew Weir.
7-11 Mar *Access & Public Rights of Way, Law and Management (Course 2):* Andrew Weir.
For LBAP PRACTITIONERS:
12-15 Apr *Local Action for Biodiversity Conservation – Focus on Reporting:* Twm Elias.
Local BAP Facilitator:
Julia Korn 01248 385 793
email: j.korn@ccw.gov.uk

Go Outdoors
ORDNANCE SURVEY OUTDOORS SHOW
18-20 Mar *Fourth year for this major event at the Birmingham NEC providing information and inspiration for all outdoor activities.*
Organised by **Brand Events** 0207 471 1082 or email: outdoors@brandevents.co.uk

Ramblers' Association Wales
Cymdeithas y Cerddwyr
FESTIVAL of WINTER WALKS
26 Dec-3 Jan
www.ramblers.org.uk/info/events/
1 Cathedral Rd, Cardiff CF11 9HA
Tel Ffôn 029 2034 3535
Fax Ffacs 029 2023 7817
cerddwyr@ramblers.org.uk
www.ramblers.org.uk/cymru

Kenfig National Nature Reserve
BOXING DAY BIRD WATCH
26 Dec Get rid of the Christmas excess with a 3 mile walk (in appropriate shoes and clothing!) Contact the reserve on 01656 743386 or David Carrington carridg@bridgend.gov.uk

Countryside Council for Wales
GREEN FINGERED HELPERS IN CEREDIGION
Wednesdays from 12 Jan 2005
CCW is looking for volunteers to keep the Ceredigion environment looking at its best. For full details contact **Paul Culyer** or **Andy Polkey** at CCW, Tregaron, Ceredigion, SY25 6LG 01974 298480
p.culyer@ccw.gov.uk

Philip Snow
WILDLIFE PAINTINGS EXHIBITON
at Pensychnant Centre, Sychnant Pass, Conwy, Viewing **all year**, but BY APPOINTMENT ONLY from October to June: Tel 01492 592595. Commissions welcome.
http://artofcreation.org.uk
philip@snow4083.freeserve.co.uk
Philip Snow, Beach Cottages, Malltraeth, Anglesey LL62 5AT
Tel/Fax 01407 840512

Butterfly Conservation Wales
WINTER EGG SURVEYS
for the *Brown Hairstreak butterfly* in Carmarthenshire and Ceredigion.
A number of other events and surveys are planned for 2005. Contact **Kelly Thomas** Tel 0870 770 6153 or Email wales@butterfly-conservation.org
Website www.butterfly-conservation.org

The Mammal Society
TRAINING COURSES
Dormice and Development
13 Jan Hampshire
15 Jan Somerset
20 Jan Swansea
22 Jan West Midlands
Tel: 020 7350 2200 or e-mail training@mammal.org.uk
Web: www.mammal.org.uk

Wildlife Trusts
WALKS AND TALKS
Turtles, bird ringing, Christmas hangover walks, wildlife crime, nematodes...
Your local Wildlife Trust has something to interest everybody. Why not contact them for a full list of events this winter?
WALES
Brecknock 01874 625708
Gwent 01600 715501
Montgomeryshire 01938 555654
North Wales 01248 351541
Radnorshire 01597 823298
S & W Wales 01656 724100
BORDERS
Avon 0117 917 7270
Cheshire 01270 610180
Gloucestershire 01452 383333
Herefordshire 01432 356872
Shropshire 01743 284280
Worcestershire 01905 754919

North Wales Wildlife Trust
17 Mar Anafon Valley walk, led by Geoff Gibbs. Fabulous views from the newly cleared area of Abergwyngregyn Forest. Phone **Kate Gibbs** to book 01248 681936.

S&W Wales Wildlife Trust
Leatherback turtles around Wales
Talk by Jon Houghton.
20 Jan Boat Club, Newport. Details from Janet Atkinson 01239 820210.
8 Mar Environment Centre, Swansea. Details from **Elizabeth May** 01792 481143.

Sea Trust
PORPOISE WATCH

1 Jan Strumble Lookout 2.30. Dress up warm and bring your bins! Other events through the year too.
Call: **Cliff Benson** 01348 875 639
www.seatrust.org.uk

For illustrations, thanks to/diolch am y lluniau i:
English Nature, Mandy Marsh, Alastair Robertson, Philip Snow

Photo/ffoto: Stewart Campbell

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